

VOLUME 3 NUMBER 7 JULY 1996

OS/2[®]

M A G A Z I N E

Reviews

**Adaptec Bus Master
Seagate Hawk 2XL
Take Command
The Maxwell**

Smart Buys

**OS/2s Preloaded
With OS/2**

Page 22

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A Miller Freeman Publication



Plus

**Beating Hostile Hardware
Extending OpenDoc
Introducing DCE**

Let The Dog Out!

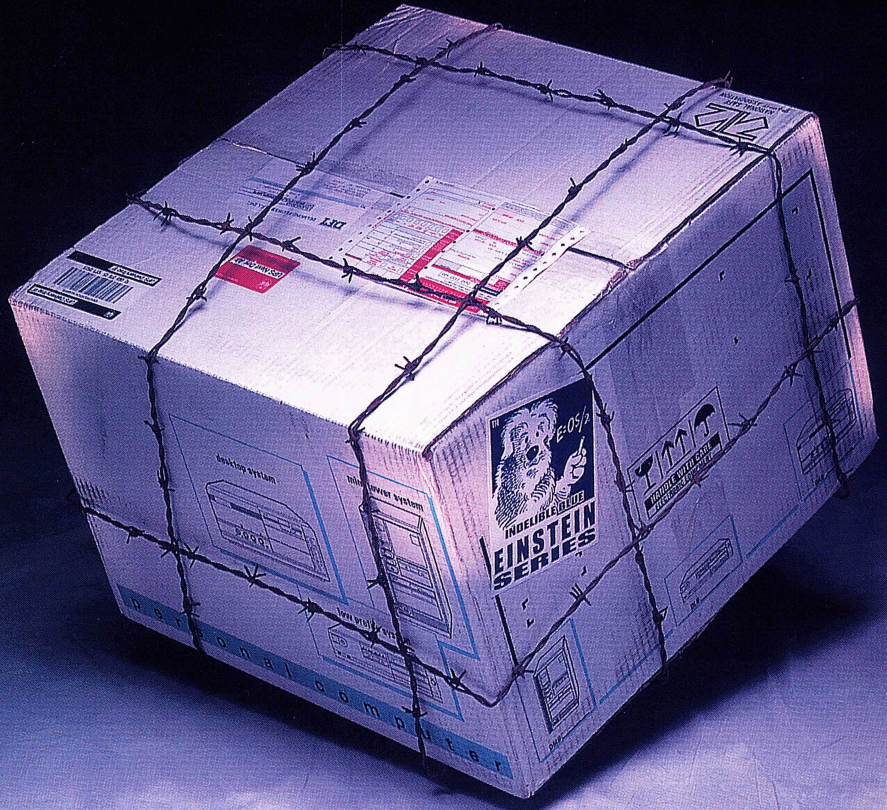
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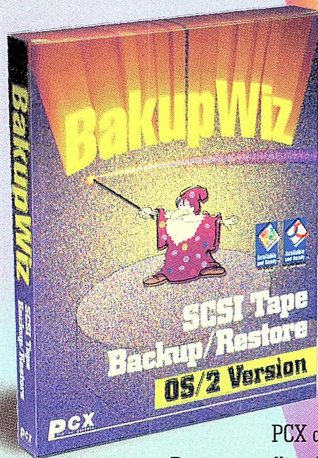
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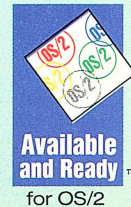
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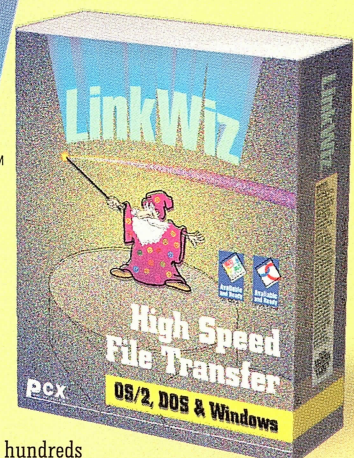
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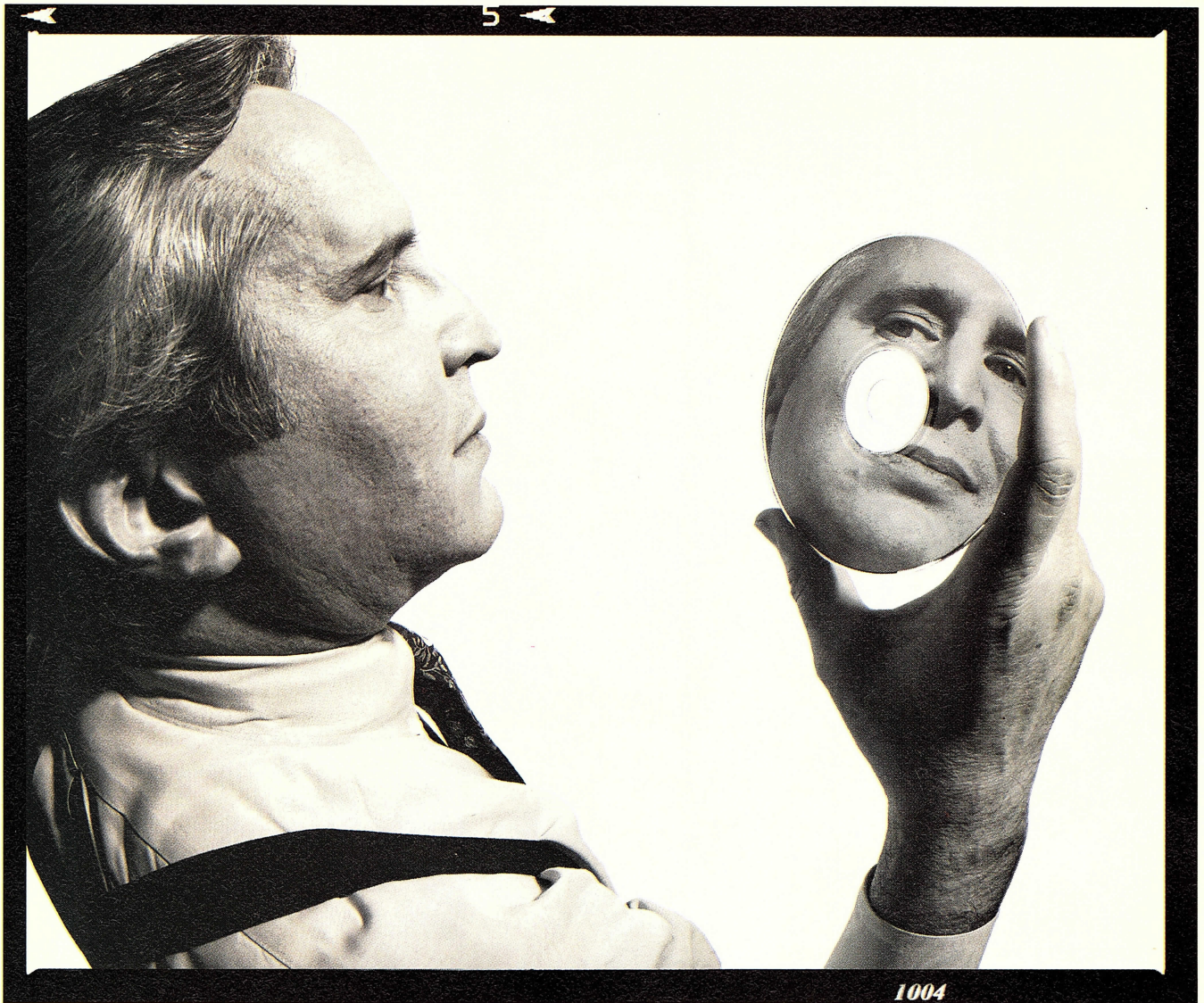
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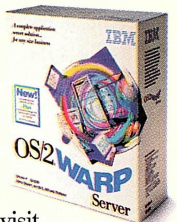
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We also maintain a Web-accessible database of OS/2-related products, the Software Solutions Buyer's Guide. You can jump to it from our main home page or link to it directly at <http://www.mfi.com/softwareguide>.

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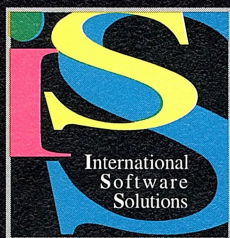
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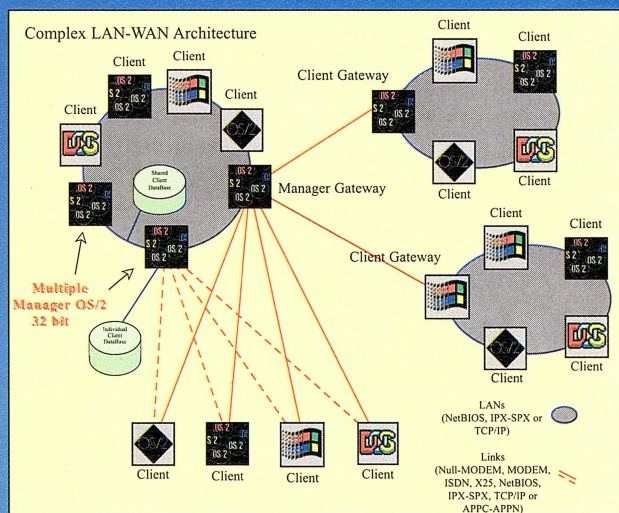
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OS/2 Professional October 1995
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Australian Personal Computer March 96
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- ♦ **Programming Script Language** - create sophisticated applications for EDS (Electronic Distribution Systems) or ADC (Automated Data Collection)

Perspectives

Random Interchange

Q: When is a code name not a code name?
A: When it's on a business card.

I'm recently back from the IBM Technical Interchange, this year held in late April at the impressively immense Opryland Hotel in Nashville, Tenn. As is my usual practice, I'm entering collected business cards (if you don't have a card, the meeting never happened, right?) into my contact database.

There it is, in blue letters above the IBM logo: Jeffrey R. Dean, *Merlin Project Lead*. Who ever heard of putting an "internal use" code name on a business card?

Code names are indeed funny things. When IBM introduced its new line of server-oriented software bundles, it chose to call them...the IBM Software Servers. This has proven such a disaster as a branding strategy that IBMers are forced to keep using the code name, Project Eagle, when talking to customers and even to each other.

Let's talk about the Tech Interchange. It was at a great place: unlike many conference hosts, IBM picks interesting locations. This year, Nashville; before that, New Orleans, San Francisco, Orlando, and Phoenix. Next year, St. Louis. It's a pleasant change from the usual rubber-omelet route between Las Vegas, New York, Boston, Atlanta, and Chicago.

Of course, until last year, we all attended the OS/2 Technical Interchange. Beginning in 1995, our hosts dropped the OS/2 exclusivity and opened the event up to developers and corporate users of OS/400, AIX, and MVS. Even so, OS/2 enthusiasts dominated the event, and the few Windows NT products seen on the show floor were clearly unwelcome (just like OS/2 products were at January's Lotusphere, come to think of it).

There's no doubt that OS/2 has departed center stage. There were no classes on the Workplace Shell, for example, or even on developing for or using the speech engine, which is doubly peculiar since speech will be incorporated into Merlin. On the other hand, because IBM's now the distributed middleware company, there were plenty of sessions on DB2 and Notes, CICS, and VisualAge cross-platform development. OpenDoc and SOMobjects were popular topics; so were TeamConnection, SystemView, VisualInfo, and FlowMark.

Are you noticing an IBM-centric pattern? It's hard to ignore when the catalog lists an intermediate-level course entitled "IBM Software Licensing Strategy & S/390 Offerings." The Big Blue focus spilled over to the show floor, too: IBM demonstration stations dominated the Opryland ballroom, with third-party solutions banished to the perimeter. There were plenty of third-party exhibitors, if you actually counted them, but IBM wasn't sharing the spotlight. (If you're looking for

a more open-minded OS/2 software development event, you should attend the ColoradOS/2 conference, October 13-18; call 719-481-3389 or browse <http://www.colos2.com>.)

Speaking of spotlight, top-level IBM executives were conspicuous by their absence. The highest-ranking IBMers visibly present were Gian-Carlo Bisone, general manager of software marketing, and Steve Mills, general manager of the Software Solutions division. Not seen: Lou Gerstner, IBM's chairman, and John M. Thompson, VP of IBM's Software Group—both of whom were front-and-center at Lotusphere four months earlier. Also missing was John W. Thompson, general manager of Personal Software Products, the division that "owns" OS/2. I hesitate to draw the conclusion that Armonk views OS/2 and AIX as less important than Lotus Notes—but you, of course, may draw any conclusion you'd like.

What about Nashville? you're all doubtlessly wondering. The low point must have been Twitty City. Contributing editors Esther and Bill Schindler took me to the home of Conway Twitty, the late country-and-western singer. His old estate, which really is called Twitty City on local maps, was purchased after his death by an evangelical broadcasting company, and it turned the property into a synonym of the word "tacky." If you're in Nashville, don't bother going to Twitty City.

On the other hand, you should *definitely* visit Belle Meade, the remains of a 5,300-acre plantation that dominated Nashville's economy (and the world of racehorse-breeding) during most of the 19th century. The restored mansion and outbuildings are spectacular, and the history of the war-torn Harding family and its slaves is remarkable.

Equally remarkable has been IBM's new openness about the next version of OS/2 Warp. Not only are key managers putting the word "Merlin" on their business cards, but they're sharing details far earlier than ever before (just check out the links from <http://www.austin.ibm.com/pspinfo/os2.html>).

Of course, there are many specifics that we still don't know, such as what the upgrade will be named, its price, its ship date, or whether a state-of-the-art Web browser will be included in the BonusPak (rumors about an IBM-funded Netscape Navigator port are flying). But IBM's getting much better at communicating with its customers, and this new *glasnost* is to be praised and encouraged.

Alan Zeichick
Editor-in-Chief



Ready for
OS/2 WARP

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OS/2
MAGAZINE
1995

1995
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Reader Service No. 6



Letters

**"I need Windows 95 emulation now,
not maybe sometime in the future."**

HPFS on Removable Media

Dear Editor:

I was just reading the article on HPFS ("Everything You Always Wanted to Know About HPFS...", February 1996, p. 26). The article states, "the HPFS specification says in writing that HPFS does not support removable media." While HPFS doesn't support removable media devices, there is at least one removable media driver that supports HPFS. Since the days of OS/2 1.2, Micro Design International Inc. has supported HPFS on selected SCSI optical drives with its SCSI Express for OS/2. To swap disks, the user must use a utility, included with SCSI Express, to unmount the disk that is currently in the drive. The user can then insert and use a new disk.

David Dillard

Micro Design International Inc.

You're right. Although HPFS doesn't directly support removable media, there are workarounds. Programs such as yours, drivers that come with Iomega's Zip drive, and Development Technologies' DCF/2, fool HPFS into thinking that removable media are fixed volumes and, therefore, enable removable media to use HPFS. IBM also has another file system available called High Performance Optical File System (HPOFS), which is designed for removable media and specifically for optical storage devices. This file system includes some HPFS features, such as long- and mixed-case file names with full extended-attribute support. The documentation is sparse, and there isn't much information available on it, but it's freely available as hpofs20.exe on most IBM online sites.

-Alexander Antoniadis

Tip #225 Revisited

Dear Editor:

David Reich's response to the question about multiple launchpads (Tip #225, April 1996, p. 17) was incomplete. You can select Copy from the

LaunchPad menu to make a copy of it that works just like the original. Of course, you have to give it a different name.

Start with a basic LaunchPad. You must do this because if you have the same item on both, a delete to one will delete both. Make as many copies as you want. Then, just add the items you want on them. For instance, I have one for applications and one for network-related programs, dictionaries, and so on. You can even add a launchpad item to a LaunchPad.

This is much easier (although maybe not as much fun) than the REXX program.

Tom Rowe

Creating multiple LaunchPads this way does not create separate and distinct LaunchPads. If you try adding and deleting some items, you will see that operations on one will affect others. You have to create a true second (or third) instance of the launchpad class in order to have truly distinct LaunchPads.

The system provides no way to do this today; hence, the REXX program in Tip #225.

-Dave Reich

Goodbye OS/2!

Dear Editor:

After over five years, it looks like I'm going to reluctantly say goodbye to OS/2. I've been sold on OS/2 since 2.1 first hit the street, but John Thompson's answer to the question "Will OS/2 ever run Windows 95 programs like it runs Windows 3.1 programs?" ("Dateline: OS/2", May 1996, p. 10) is the final straw.

I'm being dragged into the Windows 95 world at work, so I have to upgrade my home system applications to match the ones me and my team members use at work. I really can't see keeping Windows 95 software on my home system to do office work at home and Windows 3.11 copies of the same software to do personal home computing via OS/2.

Mr. Thompson's response to the question is "that he has 15 programmers determining if it can be done..." is too little, too late. I need Windows 95 emulation now, not maybe sometime in the future.

So now I'm making two tape backups of my OS/2 Warp system, packing all my disks, software, books, and back issues of OS/2 Magazine in a box, and putting it in the closet in hope that a miracle happens—soon.

Sorry OS/2, it was good while it lasted.

Jim Bolinger

Another Source for FixPak 17

Dear Editor:

I just wanted to point out that FixPak 17 is available from GO OS2FP17 on CompuServe.

Gary Wong

PrepLogo Update

Dear Editor:

Thanks to Dave Reich for mentioning my program PrepLogo in his Tips & Tricks column (Tip #232, May 1996, p. 21).

Hobbes (the FTP site: hobbes.nmsu.edu) has reorganized their directory structure and removed the *os2/warp/sysutils* directory. *plogo100.zip* now resides in the *os2/graphics* directory.

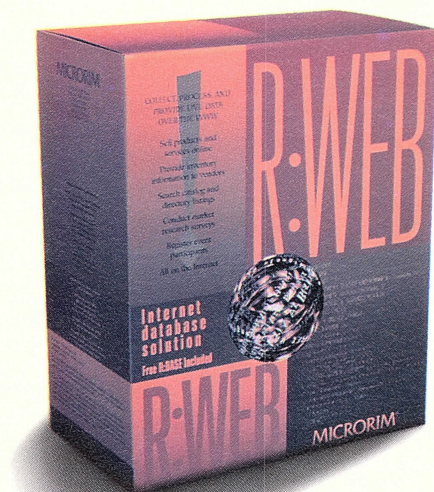
(In addition, my e-mail address has changed from that listed in the package. The new address is joncz@mind-spring.com.)

Jon Czerwinski

Errata

The price for the upgrade to Power Quest's Partition Magic 2.01 from 1.x was incorrectly listed in the May 1996 "Test Drives" (p. 60-69). The correct price is \$29.95.

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*R:BASE and R:WEB are available for OS/2 and Windows.

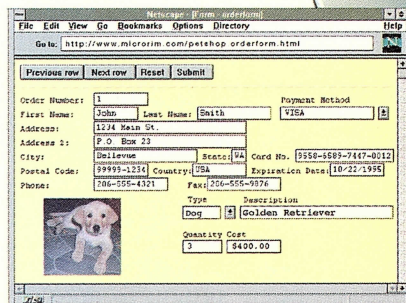


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Talking with Merlin

BY ALEXANDER ANTONIADES



Optimism abounding at the Tech Interchange

The IBM Technical Interchange (known colloquially as the TI), the main event for OS/2 software, was held at Opryland in Nashville, Tenn., this year and brought a new wave of optimism to many of the participants from the OS/2 community.

The main reason for this optimism was the first public viewing of a full version of the Merlin, a sign that this next release of OS/2 was on schedule. All of the previous demonstrations and screen shots have come from versions of OS/2 Warp Connect with FixPak 17 and Merlin DLLs applied.

This early version (build 12, according to IBM) included the hardware-independent speech recognition, OpenDoc, Developer API Extensions, and the new look and feel for the Workplace Shell. While all of this is old news to regular readers, more features were revealed when IBM let us play with it one day after the main show floor closed down.

Let me preface this by saying that one of my main concerns with Merlin was that IBM would release basically a dolled-up version of OS/2 Warp Connect with enhancements from FixPak 17, a new Bonus Pak, and a slightly reworked Workplace Shell. While that would be fine for starters, it doesn't help the aging

substructure that handcuffs both developers and users and takes some luster off of OS/2 when comparing it to parts of Microsoft's offerings.

After getting a hands-on test drive, my fears have been abated. The first change is a new software registry that initializes every boot-up time and detects what software is currently installed on your computer. Another welcome enhancement is a hardware manager similar to that of Windows 95, complete with support for plug-and-play hardware.

These two features will add to Merlin's ease of use, though there's no guarantee that they will make it into the final version. IBMers have indicat-

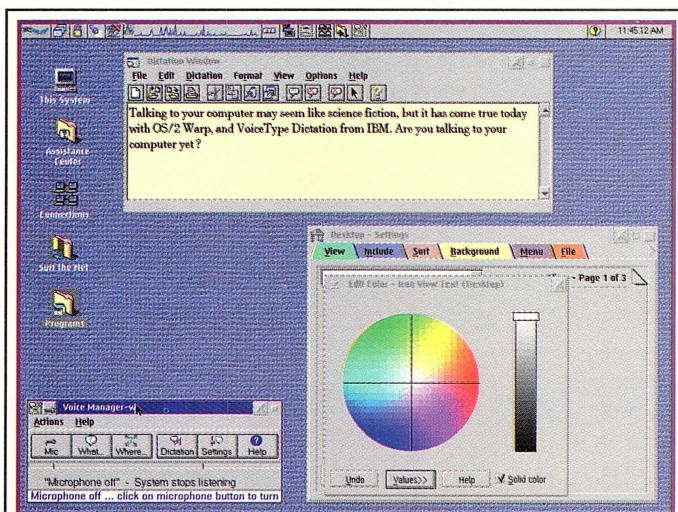
ed that they are willing to drop some features to get Merlin out on schedule in the second half of this year. That said, the further IBM can get users from *config.sys* statements like `BASEDEV=SBCD.ADD /P:220 /T:2`, the lower their support costs will be.

Simplification is at the heart of Merlin, and it shows enhancements being made to the user interface. One such change was to gather all of the online help files under one menu in the WarpCenter (Merlin's replacement for OS/2 Warp's LaunchPad). Additional help will also be available from a series of "coaches," similar to Microsoft's Wizards, that guide you through such mundane chores as adding printers or setting up new hardware.

Speech! Speech!

Even with all these changes, the show stopper remains the speech recognition. We had time to try out the speech recognition on our own and learned the ropes of navigating the Workplace Shell without hands. For example, the command "Jump to..." either switches to the active task or launches an application if you're in that folder.

The user independence worked as promised—when we took turns speaking, it continued to recognize what the new person said without a hitch. We found that speaking with brief breaks



Merlin alpha from the TI

A couple of things to note in this picture: the WarpCenter at the top of the screen replaces OS/2 Warp's LaunchPad, although the LaunchPad will still be included for those who like it; the second button on the left hand side of the Voice Manager window shows which window is getting the voice input—the icon changes to reflect whether or not the voice recognition is on; and finally, the Desktop-Settings window is one of Merlin's new InfoBoxes, which will replace all of OS/2's notebooks.

between words wasn't difficult to learn—the hard part was refraining from pausing too long between all syllables so that words would not become garbled.

Although the performance is based on an alpha version of the Merlin speech recognition, there was still a noticeable lag of one or two seconds between speaking and seeing the recognized word when running on a 133MHz Pentium. While this seems reasonable to techies who understand the complexity of the technology, few average consumers will be so forgiving. All the processing is currently done on the CPU, so a high-end soundcard is irrelevant for improving performance. Hopefully, IBM will figure out a way to either off-load some of the audio processing onto soundcards or use Intel's new MMX multimedia Pentium extensions to process speech faster.

IBM is also playing up Merlin's Internet integration with the Workplace Shell. OS/2 Warp has some of the same features today with its FTP and Telnet templates, but they are so poorly implemented that no one uses them. Anyway, this time it looks like IBM is doing it right. It's also including run-time support for Sun's Java language, so that Java programs will be able to run outside of any browser environment. IBM also demonstrated a speech-enabled version of the OS/2 WebExplorer that would search for links in a page so the World Wide Web can be navigated entirely by voice.

Speaking of Web browsers, rumors that Netscape's Navigator will be ported to OS/2 continued to fly at the conference when some of the Workplace Shell Web extensions in Merlin were shown to work with multiple Web browsers. An anonymous source at IBM said that a group of IBM programmers were already at Netscape to help port its famed Web browser over to OS/2 at last.

Objects and suites

On the SOM and OpenDoc front, IBM continues to make inroads in making OS/2 the choice for object-oriented gurus. News that all versions of the SOM toolkit are now free was accompanied by the announcement that

the SOM 3.0 beta is available from IBM's ClubOpenDoc Web page (<http://www.software.ibm.com/clubopendoc/index.html>). Hot on the heels of this announcement came word that the first commercial OS/2 OpenDoc parts were on their way as Voice Pilot, ASI, Tower, and Cirrus Technology kicked off the new marketplace.

Another key OS/2 technology showcased on the show floor was the new Lotus SmartSuite for OS/2. WordPro (the next generation of AmiPro) and Freelance Graphics for OS/2 were both being shown in near final form—perhaps both will be out as you read this column. An early version of the new 1-2-3 for OS/2, which is due out in the third quarter, was also on display. According to Lotus, a new SmartSuite will be released once some of these applications are out, with mail-in coupons to receive the rest of the suite (including Organizer and Approach) as it is finished.

And that was the news from the show. The overall mood was upbeat as the OS/2 community recovers from the bad news that surrounded the end of 1995 and early 1996. There was a general feeling that OS/2 is turning

the corner. With Windows 95 stumbling in the corporate market and Windows NT 4.0 months from completion, there's at least one more window of opportunity for OS/2 to become more than a niche market again.

It's been fun

This is my last "Dateline: OS/2," the column I'm proud to have written more often than not since *OS/2 Magazine* began. Regardless of the ebb and flow of this small market, I've often found it interesting to watch, and if you've had half as much fun reading about it as I've had covering it, then I've succeeded in what I set out to do.

OS/2

After the July issue went to press, Alexander Antoniadis left OS/2 Magazine to become vice-president of marketing for Stardock Systems. We wish Sander all the best in his new career—he's been a key part of our editorial team since our launch in 1993, and he'll be missed. His new e-mail address is sander@stardock.com.

The Editors

OS/2 APPLICATIONS TOP 15 LIST—APRIL 1996

This Month's Rank	Last Month's Rank	Product	Company
1	1	Partition Magic 2 Personal Edition	PowerQuest
2	6	IBM AntiVirus 2.4 Desktop Edition	IBM
3	2	Object Desktop 1.0	Stardock Systems
4	3	DeScribe Voyager CD	DeScribe
5	4	Backmaster 2.0	MSR Development
6	8	System Commander 2.2	V Communications
7	9	UniMaint 4.0	SofTouch Systems
8	5	Hobbes CD-ROM Archive	Walnut Creek
9	-	DeskMan/2 Productivity Bundle	Development Technologies
10	-	GammaTech Utilities	SofTouch Systems
11	7	Galactic Civilizations 2.0	Stardock Systems
12	10	FaxWorks Professional Upgrade Edition	Global Village
13	14	Bitstream Font Collection	Bitstream
14	13	Back Again/2 Professional Edition	CDS
15	-	KopyKat	Hilgraeve

Since OS/2 Warp and OS/2 Warp Connect are consistently ranked as top-selling products, and sales of additional licenses can sometimes skew results, this list has been modified to highlight only the top-selling OS/2 applications. (Best-seller information courtesy of Indelible Blue.)



Maybe It's Time to Check Into a Good Recovery Program.

Needing intervention? A malfunctioning computer can cause dysfunctional behavior. Protect your work, your computer and your sanity with Back Again/2™, the ultimate backup and recovery for OS/2 Warp.

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backup is performed. Estimate both backup time and size, plus many more configurable options.

And, BA/2 has enhanced its robust network support. It automatically finds network resources such as LAN Server and Netware File Servers. You can also back up LAN Server ACL (Access Control Lists) automatically.

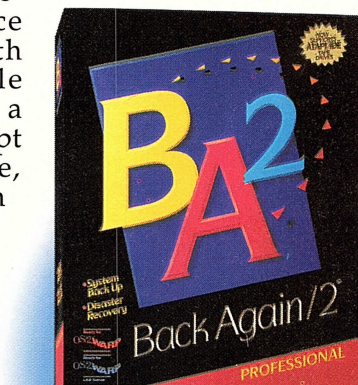
Now say this affirmation out loud, "Today I will buy BA/2 4.0, because I'm worth it." Preventive mental health begins with BA/2 4.0, the one-step recovery program.

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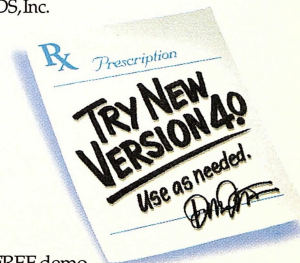
System requirements: IBM OS/2 2.1 or greater

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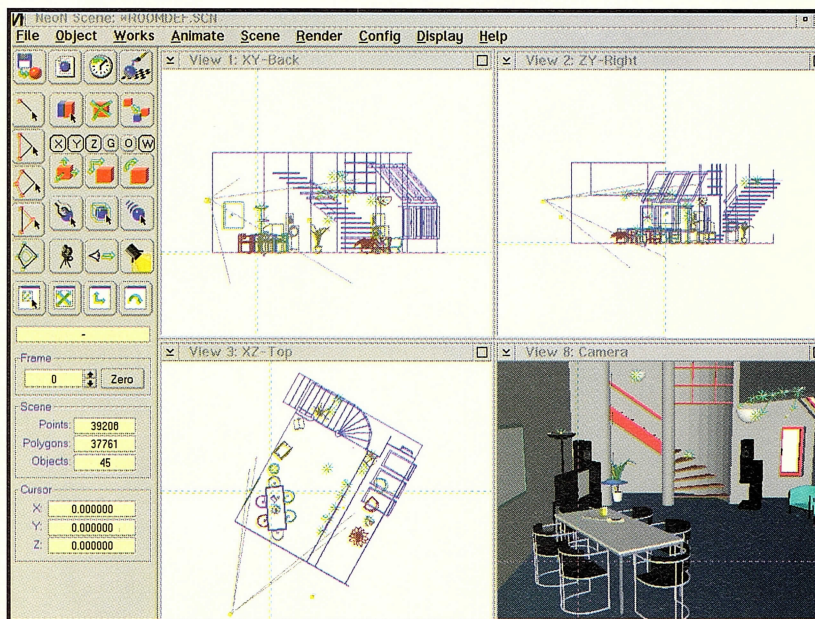
Neon Grafix 3D

3D Rendering for OS/2

TEAM Computer GmbH and Indelible Blue are releasing the first commercial rendering package for OS/2. Neon Grafix 3D has three major components: the Object Editor, the Scenery Editor, and the Renderer. The Object Editor includes elastic deformation, beveling, 3D text, and 3D morphing. The Scenery Editor is time-based and can render real-time animation previews as well as time-manipulated animations and manage spatial relationships between objects and paths. The Renderer can handle phong shading, shadows, mirroring, transparency, and texture/bump mapping, and render in interlace mode for video animation. The Light version of Neon Grafix, which has some restrictions, is priced at \$79, while the full version is priced at \$790.

Indelible Blue, (800) 776-8284, (919) 878-9700, fax (919) 878-7479, e-mail sales@indelible-blue.com, or see one of its Web pages at <http://www.indelible-blue.com/ib> or <http://www.neongrafix.com>.

READER SERVICE NO. 112



OnCMD 2.0

Visual Xbase for OS/2

On-line Data has updated its rapid application development (RAD) environment and Xbase conversion tool for creating native OS/2 applications. The OnCmd APIs provides interactive database creation, a visual design/build utility, a project manager, a report writer, and online help. Additionally, OnCmd provides access to the full OS/2 APIs (Pen, Voice, Multimedia, Notebooks) as an extension to the Xbase syntax, as well as capabilities such as DDE, DLLs, and Named Pipes and extensions such as ragged arrays and BLOB (binary large objects). A single user/developer license of OnCmd xBase for OS/2 2.0 is available for \$249, the Linker License is available for \$399, and the Index Server/Network Run-time License for six seats is available for \$299.

On-Line Data, (519) 579-3930, fax (519) 579-2130, or e-mail oncmd@onlinedata.com.

READER SERVICE NO. 113

UniMaint 5.0

Uninstaller now moves too

SoftTouch Systems is releasing a new version of its OS/2 Desktop and .ini maintenance program. UniMaint 5.0's main new feature is its ability to move OS/2, DOS, and Win-OS/2 programs dynamically between drive partitions and across different machines. Other new features include automatic desktop backup and wizards to guide users through complex functions. UniMaint 5.0 is priced at \$99. For people who purchased UniMaint 4.0 after April 17, 1996, upgrades are free; other owners can upgrade for \$39.95.

SoftTouch Systems, (405) 947-

8085, fax (405) 632-6537, e-mail webmaster@softtouch.com, or see its Web page at <http://www.softtouch.com>.

READER SERVICE NO. 114

Traveling Workplace 1.1

Take your desktop with you

Syntegration has a new utility that helps users move and maintain their OS/2 Desktops. Traveling Workplace archives and restores the files necessary to create versions of the Workplace Shell. Additional features include the ability to backup and restore individual Workplace Shell objects and the ability to switch between multiple online desktops. Traveling Workplace is available for \$59.95.

Syntegration Inc., (909) 464-9450, fax (909) 627-3541, e-mail 73707.

3331@compuserve.com, or see its Web page at <http://www.primenet.com/~syntegrn>.

READER SERVICE NO. 115

Mirage

Multimedia manager

Snow Storm Software is releasing new multimedia management and presentation software for OS/2. Mirage scans all storage devices and makes thumbnail representations of multimedia files that can then be used to organize and create presentations and screen savers. Various sound, image, and video formats are supported directly through Mirage, and new support can be added via OS/2's MMIO procedures. Mirage is priced at \$129.

Snow Storm Software, (403) 547-0669, (403) 547-1018, e-mail snow-stm@ibm.net, or see its Web page at <http://www.pacificablue.com/sss>.

READER SERVICE NO. 116

InCharge 1.02

Updated finance package

Spitfire Software is releasing an update to its personal finance utility for OS/2. InCharge 1.02 offers new features such as a financial planning module, a small business module, CheckFree support, optional memorized transactions, securities portfolio management, and goal accounts for savings planning. Enhancements to the user interface include a fully graphical report system, new dialog boxes (including a new transaction spread dialog), and more pop-up menus (including a new pop-up calendar to make entering dates easier). InCharge 1.02 is priced at \$79. Users of 1.01 or earlier can download the new version for free from Spitfire's CompuServe forum or Web page. Upgrading users who want new disks and documentation can order them for \$49 direct from Spitfire.

Spitfire Software, (404) 257-0187,

fax (404) 255-8032, e-mail landeck@onramp.net, or see its Web page at <http://rampages.onramp.net/~landeck>.

READER SERVICE NO. 117

Process Commander

Kill bad apps better

Stardock Systems is announcing a new utility for terminating stubborn applications that can't be killed by the OS/2 system. Process Commander kills applications that are blocking the Workplace Shell's input queue without shutting down the system; rogue OS/2 applications can also be killed remotely by telnetting to the blocked machine. Process Commander retails for \$69.

Stardock Systems, (800) 672-2338, (313) 453-0328, fax (313) 453-1480,

e-mail info@stardock.com, or see its Web page at <http://www.stardock.com>.

READER SERVICE NO. 118

JFactory

Visual Java for OS/2

Rogue Wave is releasing the OS/2 version of their visual application builder and code generator for Java. JFactory's development environment features context-sensitive pop-up menus, a user-extensible Object Library with Object Manager, Import/Export capabilities, and a source editor with clipboard support. JFactory is available for \$495.

Rogue Wave, (800) 487-3217, (541) 754-3010, fax (541) 754-3185, e-mail sales@roguewave.com, or see its Web page at <http://www.roguewave.com>.

READER SERVICE NO. 119

OS/2

Just Announced OS/2 Internet Sites

Unofficial Object Desktop Tips Page

<http://www.webbuild.com/~neice/objdesk.htm>

Tips for those who use Object Desktop abound at this site.

OS/2 zonE

<http://www.os2zone.aus.net/>

A new electronic OS/2 magazine.

Cyberblue OS/2 Online Exploration Guide

<http://www.cyberblue.com/>

Yet another site chock full of links to interesting OS/2 sites and information.

OS/2 Desktop Enhancement Mailing List

<http://www.best.com/~mperry/os2desk.html>

Information on how to subscribe to the various mailing lists that share information on OS/2 desktop products optimization and configuration.

Dallas/Fort Worth OS/2 User Group

<http://www.computek.net/public/dfwos2ug>

If you're in the Dallas/Fort Worth area, this page is a must for finding out what is happening with OS/2.

The Unofficial OS/2 Java Home Page

http://www.3cat.com/java_os2/javaos2.html

Up-to-date information on IBM's OS/2 Java-related work.

(Information courtesy of Vicci Conway, vicci@ibm.net.)



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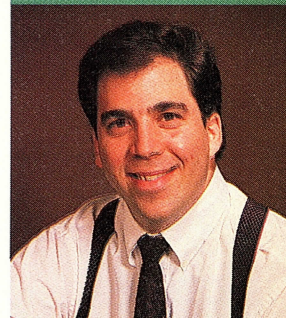
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TIP 239

LAUNCHPAD TEMPLATES

Q: I like the idea that the Workplace Shell REXX program creates a new LaunchPad, but do I have to do this each time I want a new one? I'd like to have a separate LaunchPad for each folder work area I have.

A: Mike Ruskai sent in a small REXX program that is a spin-off of the one I wrote about (Listing 1). This one will not create a new LaunchPad for you, but it will create a template for the LaunchPad class, something not provided by the operating system. While the program published earlier creates a new instance of the WPLaunchPad class, this program will create a template so you can create new instances as you wish.

Type in the following program as written, using your favorite editor,

and name it something like *newlpt.cmd*. Then run the program once; you will have the new template in the Templates folder and you'll be all set.

TIP 240

VME AND PROTECTONLY

Q: I have a multiple choice question for you. Disabling VME (setting VME=NO) on an OS/2 machine with the statement PROTECTONLY=YES in the *config.sys* file will:

- a) improve system performance
- b) harm system performance
- c) not affect system performance at all.

A: Setting VME=NO in *config.sys* on a system with PROTECTONLY=YES in *config.sys* will have no effect. VME stands for Virtual Mode Extensions and is a set of high-performance routines

for VDMs or DOS sessions. Because you have PROTECTONLY=YES effectively disabling the starting of any VDM, setting VME=NO will have no effect on the system.

If you do not have PROTECTONLY=YES, VME=NO will, in general, slow down some operations in DOS sessions but should have no effect on your protected-mode OS/2 programs. The reason you might want to try VME=NO is if you are having some problems with your DOS programs that changing settings and migrating the programs won't help.

TIP 241

WIN32S UPDATES

Q: I have installed *w32sole.exe* to run the Mosaic browser as a backup to the native OS/2 WebExplorer. This Win32 program works fine if I boot to DOS, however, when I try to use Mosaic in the Win-OS/2 full session, I get the following error messages:

w32s - error reinstall

followed by:

one or more of the library files are damaged....

Because the program works in DOS and Windows and doesn't in OS/2, it is logical to assume that a) the program is looking for certain files that it can't find in an OS/2 session or b) a problem is occurring with some OS/2 files.

A: Most likely, the program you are

Listing 1: Program to create new Template.

```
/* Program to create new Template */
call rxfuncadd sysloadfuncs, rexxutil, sysloadfuncs
call sysloadfuncs
type='WPLaunchPad'          /* Use the WPLaunchPad class */
name='LaunchPad Template'   /* Give it a name */
loc='<WP_TEMPS>'            /* Tell it where to go */
                             /* Give it an ID and set the */
                             /* Template flag */
options='OBJECTID=<LP_TEMPLATE>;TEMPLATE=YES'
/* Now create the object, which is the Template */
rc=SysCreateObject(type,name,loc,options,'R')
```

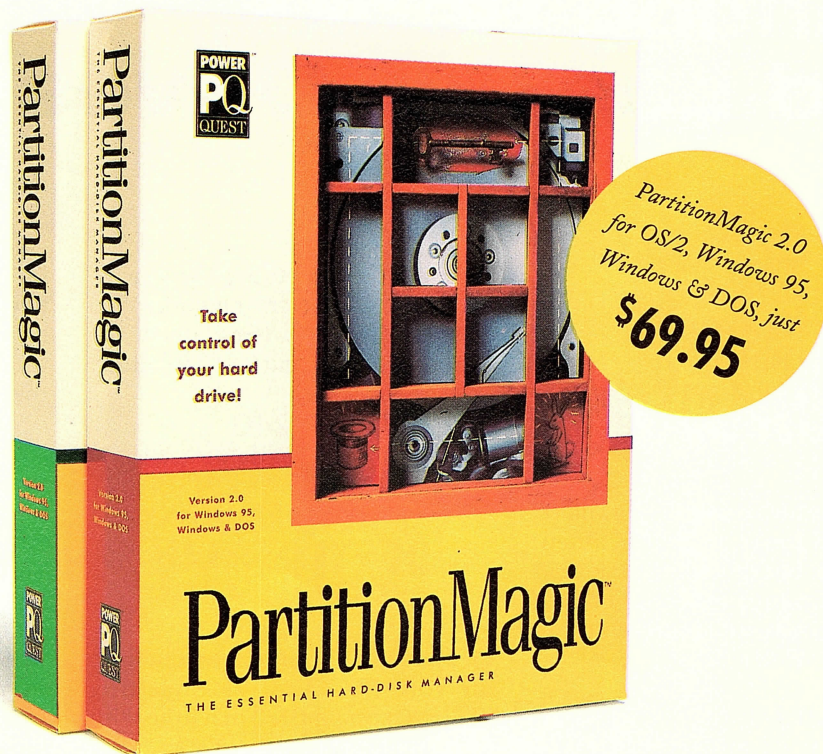



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PC Magazine, March 26, 1996



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Tips & Tricks

running requires a Win32S level higher than 1.15, which is the latest current and publicly available version for OS/2. A beta of 1.25 is available on CompuServe and the Internet. Be sure to follow the instructions carefully with the configuration modification when you install this level of Win32S. The detailed information on it can be found in the *readme* with the package.

TIP 242

NEW MODEM

Q: I just installed a new 14.4 modem under OS/2 Warp. In my efforts to get it going I checked the MODE command for that COM port. It reads, baud=1200. Should this be set to the highest speed of the modem? How about the other COM ports? Any thoughts you may have will be greatly appreciated.

A: The MODE command either

queries the status of a device or port, or, depending on the parameters you send along with the MODE command, will set the status of a port. For example, you could type:

```
MODE COM1 9600
```

to set the baud to 9600. It looks like you are trying to see the COM port's settings. The default is 1200 baud. In general, when you run a communications program, the program will allow you to set the line speed (baud) within the program, and it will set the communications port itself. It is not often that you need to set the port before the communications program.

Therefore, don't be bothered if the 1200 shows up with a MODE command. In fact, I wouldn't worry if even after you run and then terminate the communications program if the baud is still set to 1200, because many programs save the initial COM port speed, set it to what it needs while it is running, and then restore it to what it was upon termination. The real key is whether the commu-

nications program is performing as you think it should. Use your communication program's utilities to ensure it is communicating at the desired speed.

TIP 243

FASTER LOADING

Q: My problem involves running a Win-OS/2 session. The first Windows program I run in OS/2 always seems to take forever (even on my super-speedy Pentium 90). This problem always clears up on other Windows programs I run later, though. I've been told that OS/2 Warp must load all the Windows DLLs for the first program, and that if I run a small program minimized on OS/2 startup it will solve the problem—which it does—but is there a better way?

A: Running a program minimized on system startup will solve the problem,

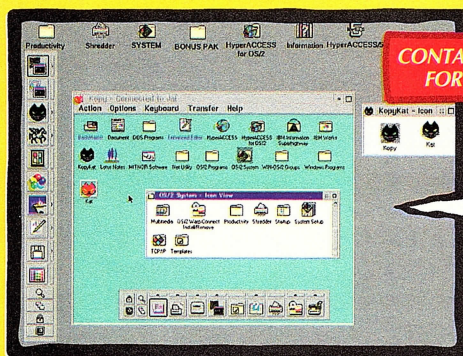
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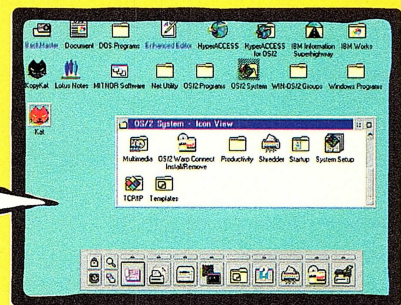
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but the OS/2 programmers have designed an even easier way. There is a Win-OS/2 **FastLoad** option you can use to load just the Win-OS/2 support code at system startup and not have to bother with loading an application which will also use memory.

To set up **FastLoad**, Open the OS/2 **System** folder and then the **System Setup** folder. Inside the **System Setup** folder is a Win-OS/2 setup object. With a left double-click, open that object; on the first page of the settings notebook, you will see a checkbox for Win-OS/2 Window, and underneath that, a checkbox for **FastLoad**. Checking this box will cause a copy of the Win-OS/2 support code to be loaded when the system starts up.

Note that this copy of Win-OS/2 is only available for Seamless Windows programs (running in a Win-OS/2 window) that are *not* set up to use separate sessions. If you choose to run your programs either in their own separate Win-OS/2 window or full-screen sessions, a new copy of Win-OS/2 code will be

loaded for each one, taking time and memory. However, if you run them in the same Win-OS/2 window session, you can share the same copy of Win-OS/2 support code that was loaded via **FastLoad**, saving time and memory.

TIP 244

LOCKDRIVE DRIVER

Q: Why do I get the message: "LockDrive Filter: Some devices requested could not be locked"? How can I find out what device cannot be locked and how can I get rid of this message?

A: LockDrive is a filter, shipping on the Device Driver Developers Kit (DDK), that essentially allows one to have a device lie to a file system. For example, HPFS is not designed to be used on removable drives such as floppies. However, for some devices such as opticals, or other removable SCSI

devices such as bernoulli box drives, HPFS is a logical thing to do. Since these devices, when queried, report back that they are removable media, HPFS will refuse to format them. LockDrive was developed (and can be part of a device's ship package) to have it lie to the file system for these types of devices and report that it is nonremovable media, so the HPFS format will not fail.

The message you are getting is that some devices could not be locked. I assume you have some device that installed LockDrive for you, but maybe the device is offline when LockDrive initializes and tries to lock it down. OS/2

David Reich has been with the OS/2 development team since 1987 and has written numerous articles on OS/2. Questions for David can be addressed to 76711.632@compuserve.com and speedracer@austin.ibm.com.

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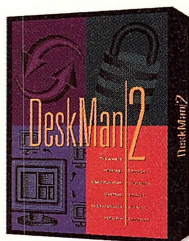
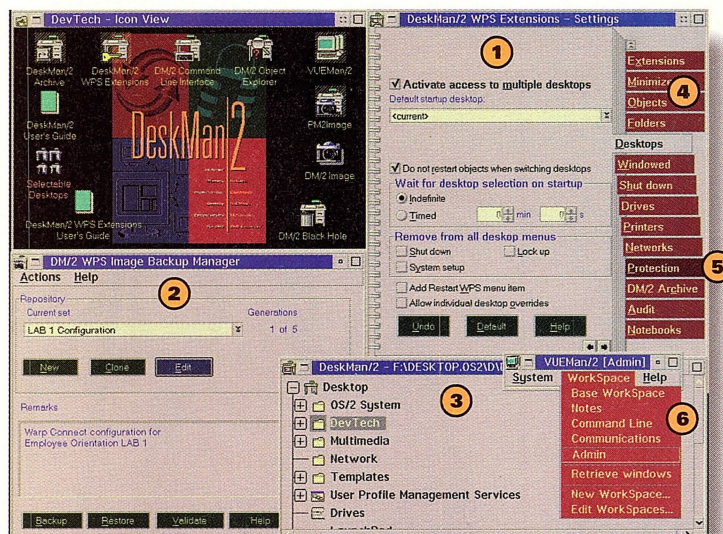
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Reader Service No. 14

The Preload

By Brian Proffitt



uation

Where can you buy a PC with OS/2 already installed?

Self-respecting readers of *OS/2 Magazine* know that the next computer they buy should have OS/2 Warp preloaded, rather than that other Brand W. As you browse the pages of some general-purpose computer magazines, though, it may seem like that's a tall order. Microsoft has done an excellent job of selling its line-operating systems to hardware vendors and, typically, on an exclusive basis.

Microsoft does not, however, have a monopoly. There are indeed a few hardware vendors that don't start explaining the errors of your ways as soon as you mention OS/2. In fact, some hardware vendors are quite vocal about their support of OS/2.

To check the state of the market for systems preloaded with OS/2 Warp, I made anonymous calls to hardware manufacturers based in the United States. I specifically requested a 133MHz Pentium-based multimedia desktop system with 16MB RAM and around 2.0 gigabytes of disk space. I also requested that OS/2 Warp be preloaded on the system. IBM provided a short list of companies, which it believed would preload OS/2 Warp, and I made calls to other prominent vendors to check their response.

Some very helpful

For the most part, the vendors that support OS/2 Warp do so enthusiastically. Austin Direct, Diamond Flower Inc. (better known as DFI), HD Systems, and the OS/2-exclusive Indelible Blue all agreed to put together OS/2 systems without hesitation. Dell agreed too, but with a caveat. After putting together a quote for a Dell Dimension system with all the parameters I requested, I asked again (as I did with all vendors) if the representative was sure that OS/2 device drivers for all components were available. At that point, he said, "Oh, that's right, you wanted OS/2. We don't offer OS/2 on the Dimensions because there were too many configuration problems. I'll have to

change you to an Optiplex system." When asked the difference, he replied, "Well, it's more of a heavy-duty corporate system."

It also had an unrequested network adapter, a higher price tag, and I had to back down from a 6x CD-ROM drive to a 4x drive.

IBM's enthusiasm was limited also. The Aptivas that the company markets so aggressively are not available with OS/2 Warp. In fact, the only line offered with OS/2 is the PC 300 series. The IBM systems preloaded with OS/2 Warp are dual-boot "Select-A-System" configurations with Windows 3.11. An option on the Windows side removes OS/2 from the system, but no corresponding option on the OS/2 side to remove Windows is available.

Getting this information wasn't easy. First, IBM doesn't sell these systems directly; the company directs you to an authorized dealer "near" you. Although I live in a fairly metropolitan area, IBM couldn't locate any that weren't a long-distance call. When I called the recommended dealer, the company responded that it only does corporate sales and really wished IBM would stop sending people to them. I called IBM again, and it was unable to locate any other dealers in my area code. It gave me the numbers of three mail-order companies to contact. When I called the first mail-order company, the vendor (Computer Discount Warehouse) actually became frustrated with my insistence for an all-IBM system. He was bemused by my unwillingness to accept his offer of better hardware at a lower price from other vendors.

Nevertheless, the enthusiasm of some vendors was quite refreshing. When I asked the Diamond Flower representative if OS/2 could be preloaded, he replied, "Of course," as if it were a somewhat silly question. After this anonymous conversation, I called John Matlock, DFI's Director of Marketing, to ask about the company's attitude toward OS/2.

"It got started," Mr. Matlock said, "when a customer simply insisted that we preload OS/2. We thought, 'Sure, if that's what the customer wants, why not?' We do a lot of sales at the high end with our Doubleshot systems. With those, you can't use the standard Windows 95, Windows for Workgroups, and so on, and the world becomes much more competitive. The choices were essentially UNIX, Windows NT, and OS/2 SMP. We thought we could achieve more market share in the OS/2 world than we could the other two."

When I asked Mr. Matlock his opinion on the future of OS/2 and his company's relationship with the product, he said, "I'm somewhat limited on what I can say due to nondisclosures. Let's just say the future looks very good."

IBM's International OEM Partners

IBM Corp. was kind enough to provide a list of OEM hardware partners outside of North America. It's difficult to define exactly what that means, because not all of these companies offer OS/2 preloaded. But at least these are firms that have heard of OS/2 Warp.

Belgium: InfoBrix

Australia: Osborne

United Kingdom: Adams Technology

Japan: AST Research, Dell, Densitron,

JEC, Mitac Japan, Qualest, Toshiba

Germany: Escom, Vobis

Some in the middle

Gateway 2000 will not preload OS/2 Warp on its systems because of its Windows licensing agreement with Microsoft. On the other hand, the company does try to accommodate OS/2 users. Avery Reiss, Gateway's Software Team Leader, said, "We test all our systems with OS/2 and guarantee their compatibility with OS/2 Warp. If customers install OS/2 Warp on their systems, we'll continue to support the hardware."

Table 1: How vendors responded to our request for an OS/2 multimedia system.

	Alaris	Austin Direct	Compaq	Dell	DFI	Gateway 2000	HD Computer	IBM PC Co.	Indelible Blue	New MMI Corp.
Model	(1)	PowerPlus	(1)	Optiplex (2)	P133	(4)	Victoria	PC 310 (3)(5)	Einstein/Galileo	CMO
Processor		Pentium 133		Pentium 133	Pentium 133		Pentium 133	Pentium 133	Pentium 133	Pentium 133
Memory		16MB EDO		16MB	16MB		16MB	16MB	16MB EDO	16MB
Disk		2.0GB EIDE		Fujitsu 2.0GB IDE	Western Digital 1.6GB IDE		Seagate 2.0GB EIDE		Western Digital 1.6GB IDE	Seagate 2.14GB EIDE
CD-ROM		Toshiba 6X		4X	Sanyo 6X		Toshiba 6X	SunMoon Star 6X (6)	Mitsum 6X	Creative Labs 6X
Video Adapter		VideoLogic GraphixStar 300 2MB		Number 9 2MB	SanyoS3 Trio64 2MB		Diamond Stealth 64 2MB		Hercules Graphite Terminator 2MB	Diamond Stealth 64 2MB
Sound		Integrated Creative Labs SoundBlaster 16		Integrated Sound-Blaster 16 Compatible	Sound Blaster Pro Compatible		Creative Labs 16-bit SoundBlaster	SunMoon-Star	Sound Blaster Compatible	Creative Labs 16-bit Sound Blaster
Support		3-yr. Parts & labor, 1st yr. onsite. Lifetime toll-free phone support		3-yr., 1st yr. onsite, 2nd & 3rd yrs. parts only	1-yr. onsite. 2nd yr. onsite \$69		1-yr. Parts & labor, lifetime toll-free phone		2-yr., 1st yr. onsite.	

(1) Declined to offer systems with OS/2 Warp preloaded, provide device drivers, or support systems with OS/2 installed.

(2) OS/2 Warp preload available only on the Optiplex corporate systems, not the Dimension series.

(3) OS/2 Warp preload not available on Aptiva systems.

(4) Will not preload OS/2 Warp, but guarantee OS/2 compatibility on their systems. Will provide OS/2 device drivers, and will support hardware if OS/2 is installed by user.

(5) Not purchaseable from IBM directly, referred to local dealer.

(6) SunMoonStar is a new brand name from Sony Corp.

When asked about future plans to preload OS/2, Mr. Reiss said he couldn't comment on that, but "we intend to continue to support OS/2 with device drivers for all our systems."

Some not so helpful

The first vendor on the list that IBM provided us with was Alaris, marketers of IBM Blue Lightning hardware. Its representative said the company doesn't offer systems with OS/2 Warp preloaded, because it doesn't have a contract with IBM. Sounds like a communication problem.

The Compaq representative actually laughed at me. He said, "Why would we do that? IBM is a competitor!" He seemed unable to grasp the point that people interested in IBM software weren't necessarily going to spend money on IBM hardware. I pointed out that Compaq was forcing people to give money to Microsoft for operating systems, and asked what the difference was with them spending money on IBM

software. He never got the point that Compaq's attitude was actually forcing people who wanted OS/2 to go to Compaq's competition for hardware.

State of the market

I'm sure it comes as no surprise that most hardware vendors will not preload OS/2 Warp. Microsoft has an excellent marketing team and an equally strong set of contract lawyers. Nevertheless, the OS/2 user has several options when selecting new hardware. DFI, who initially hadn't been preloading OS/2, chose to move to the OS/2 market for a very direct reason: a customer asked them to do so. Don't take the first answer from the salesperson you speak with, but press him or her on it.

The mandates of capitalism are fairly simple: customers take their money to the supplier that provides the best combination of what they want at the price they want. Correspondingly, suppliers are motivated to move in the direction that the customers' money dictates. Per-

haps that's why local dealers are often more accommodating. When I spoke to the salespeople at a local store, their first reaction was that they had Windows 95 preloaded on all their systems. I made it clear that I wasn't interested in removing Windows 95, installing OS/2 Warp, installing device drivers, and so on. To make the deal, the store agreed to do the installation and compatibility testing for me. Yes, admittedly, it cost a little bit extra. But that can be a small price to pay to get exactly what you want, with OS/2 Warp compatibility guaranteed. And each such request the company gets pushes it closer to making OS/2 a standard offering. **OS/2**

Brian Proffit was part of IBM's OS/2 team and left to become the director of PC Week's Corporate Labs. He is now the president of Visionary Research, senior contributing editor for OS/2 Magazine, and solutions advisor to PC Magazine. E-mail him at 75300.1466@compuserve.com.

As we were going to press, we learned of a new OS/2-exclusive hardware vendor, Simply Intelligent Systems, too late to include in the article. Contact them at 800-672-2388, 512-346-8898, fax 512-346-8936.

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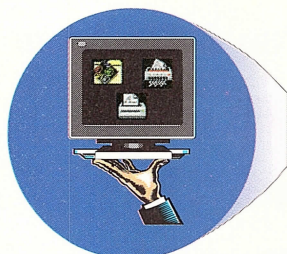
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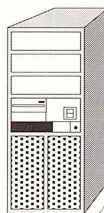
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OS/2 on Hostile Hardware

A report from the trenches. **By Brett Glass**

OS/2 is a dream to use once it's properly installed on your machine. But getting it that way can truly be a nightmare, especially if you must deal with the problem of "hostile hardware." When I say hostile hardware, I don't mean evil robots from outer space but rather any computing device—be it a laptop computer, video card, CD-ROM drive, sound card, or toaster oven—that lacks current and complete OS/2 support from IBM or the hardware manufacturer. In this article, we'll discuss some of the problems that may crop up and point out some specific workarounds that helped get OS/2 running on a particularly challenging machine: Gateway 2000's Solo P90 notebook.

Driver dilemmas

One of the most common hostile hardware problems that many OS/2 users encounter is the lack of software drivers for important pieces of hardware. In some cases, there's no driver—either on the OS/2 disks or in the hardware package—that will make the hardware work. In my experience, only about one out of 10 hardware vendors have technical support personnel who are knowledgeable about OS/2. Of those vendors that do have drivers for their hardware, many only developed them for earlier versions of OS/2 (usually OS/2 2.0 or 2.1, because Microsoft LAN Manager ran on those versions) and have not updated these drivers for OS/2 Warp 3.0 or OS/2 Warp Connect.

IBM has made it difficult or impossible to use some older but still functional drivers by changing the way OS/2's installation utilities work. For example, DSPINSTL (the display installation utility built into OS/2) is the old way of installing a display driver; Selective Install is the new way. However, because video card vendors have not updated their installation software, one must often use DSPINSTL to get a driver installed. Because DSPINSTL does not fully update Selective Install's database of installed equipment, conflicts can occur when you use Selective Install later.

In another example, I recently attempted to use a Xircom PCMCIA modem/Ethernet card in the Gateway

Solo under Warp. Unfortunately, Xircom's driver was written for OS/2 2.x and was not Resource Manager-aware or compatible with OS/2 Warp's Card and Socket Services. To make the driver work at all, I had to tell OS/2 Warp to ignore one of the PCMCIA sockets, which let the driver activate the Ethernet interface when the card was plugged into that socket. The modem would only work from the other socket, and if the machine went through a suspend/resume cycle, or the card was removed and reinserted, the Ethernet interface was not reinitialized. The machine had to be rebooted before Ethernet would work again. Calls to tech support did not produce any helpful solutions to these problems.

In still other cases, a working device driver fails when it encounters hardware that's just slightly different than what's expected. When I tried to install OS/2 Warp Connect on a Zeos Pantera system, the CD-ROM driver failed to work because the proprietary Mitsumi CD-ROM interface was set for I/O Port 310 (not 300) to avoid a conflict with the motherboard. The new driver I downloaded didn't solve the problem and came with no documentation; I had to disassemble the driver code to discover how to specify a new port and IRQ on the driver's command line.

Sometimes, it's not the individual hardware items but a combination of them that proves to be hostile. I recently attempted to install OS/2 Warp Connect from a CD-ROM on to an IBM ThinkPad 701C (the popular "Butterfly" model), equipped with an Adaptec PCMCIA SCSI interface and a standard SCSI CD-ROM drive (the Media Vision Reno). While all the pieces worked individually and were supported, IBM had never contemplated the notion that one might install OS/2 using this hard-

ware combination and never tested a similar configuration. So, when the software generated a *config.sys* file midway through the installation process, it disabled the CD-ROM, and the installation was unable to continue. (I ultimately got around the problem by painfully making a complete set of installation diskettes and forgetting about a CD-ROM install.)

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Finally, you may find that OS/2's installation process—which tries to detect installed hardware without giving the savvy user a chance to override—simply freezes up on Disk #1 (or D1, as IBM calls it in-house) with no explanation as to what is wrong. Believe it or not, this is also a device driver problem. IBM's installation routines always attempt to load every device driver on the disk to find out which hardware is installed. (OS/2, unlike Windows NT, doesn't provide an easy way to select only the drivers you need, so you must manually edit *config.sys* to avoid a crash.)

Getting support

What do you do when hardware doesn't work? One technique that rarely helps, alas, is calling the hardware vendor. I attempted to install OS/2 Warp Connect on a Gateway 2000 Solo—a popular color laptop. I encountered every one of the problems mentioned above (plus a few others). But when I called Gateway for help, support was inconsistent, to say the least. During some calls, I was lucky enough to get a representative who was willing to be helpful. On others, the response was decidedly cool; the representative did not know the correct answer and would not transfer me to someone who was more familiar with OS/2. And one technician's response was not only incorrect but surprisingly rude: "We don't sell OS/2, so it's illegal for us to support it. Is there anything else I can help you with today?"

My advice: Call repeatedly and insist on speaking to an OS/2 expert or advocate. Every department usually has one, as with Gateway.

IBM's support was no better. Because the Solo was not included in a six-month-old list of supported hardware (it hadn't even been shipping for six months at the time), IBM would not provide drivers, advice, or any helpful information.

As it turned out, my best support resource was not any of the vendors but was CompuServe and the Internet. I discovered that some old OS/2 display drivers for the Gateway ColorBook, found on Gateway's BBS and Web site, would work on the Solo if one ignored copious error messages during installation. The sound chip began to work—mostly—after I upgraded the BIOS and installed new drivers from the chip manufacturer. And PCMCIA, which didn't work at all at first, began to function once I used a magic incantation in *config.sys*, together with a driver intended for AST machines.

Get it working

Because I've spent so many hours fighting hostile hardware, I've developed an approach that, while not foolproof, will get OS/2 Warp working on most machines. The first goal is to install the base operating system successfully, get a back-up program running, and back up the hard disk to tape.

To maximize your chances of success in this endeavor, it pays to do a little legwork ahead of time. First, make sure your system's motherboard and video BIOSes are up to date. Many motherboards, and most laptops, have BIOSes that are

stored in flash ROM and can be updated by a program obtained from the manufacturer's BBS. OS/2 is extremely finicky about BIOSes and is especially sensitive to a laptop's Advanced Power Management firmware; it may crash or fail to install if this portion of the BIOS isn't up to date. And video drivers may fail to install or exhibit odd behavior if you don't update your video card's ROMs (usually by exchanging them for new ones).

Next, make sure there are no hardware conflicts in your system. Make sure that you're not doubling up peripherals on interrupt request lines. (IRQs 3, 4, and 5 are often sources of conflict, and many users don't realize that, for historical reasons, IRQs 2 and 9 are really the same.) The range of I/O ports around 300 hex is also a common site of conflicts.

You're now ready to begin installation. To ensure the best chance of success, always install the absolute latest-shipping version of OS/2 available. Don't hesitate to buy OS/2 Warp Connect even if you don't plan to use all the features. The tested updates and bug fixes in the most current version of OS/2 are well worth any additional cost. Don't rely on

FixPaks to update an older version, because some, FixPak 16 in particular, have been known to cause as many problems as they solved.

If you're lucky, the installation will come off without a hitch. If you're not, you'll usually encounter one of two problems: failure to recognize the CD-ROM drive or a complete lockup while Disk 1 is being read.

If the CD-ROM drive is not recognized, check the OS/2 manual to see if it mentions potential problems (and workarounds) for your particular model. You may also want to check CompuServe, the Internet, and your computer vendor's support line. But if

you can't get a quick answer, the fastest route to a successful installation is usually to make floppies and install from them. Once OS/2 is installed and backed up, you'll have a working system with which you can tinker until the CD-ROM drive works.

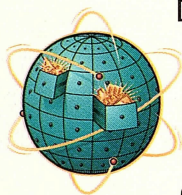
If you experience the "Disk 1 lockup" problem, the solution is a bit more difficult. Write-protect Disk 1, make a copy, and open the disk's *config.sys* file with your favorite text editor. Look closely at each **BASEDEV=** statement and remove the drivers associated with hardware not present on your system. (On the Solo, which doesn't have SCSI and uses an IDE CD-ROM, I removed all the lines associated with SCSI host adapters and SCSI CD-ROMs.) Removing some of your favorite hardware, especially network interface cards, may also help to get you through the initial installation.

Sometimes, installation proceeds smoothly but fails after it gets past the Selective Install utility and the system reboots. If this happens, try enabling only a subset of your machine's features or installing for a plain vanilla VGA display. If you're installing OS/2 Warp Connect and intend to use networking, don't bypass network installation altogether, because an attempt to install it later may fail. Rather, install for dial-up networking only and use the MPTS icon to add LAN support later.

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repeatedly and insist
on speaking to an
OS/2 expert or
advocate.**

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Hostile Hardware

Getting it all together

Once you're past the initial install hurdle, it's time to attack the remaining peripherals one at a time. Prepare to spend time downloading drivers, waiting on hold for support, and posting messages on the Internet or CompuServe. (For me, one full afternoon per hostile hardware device is about average.)

Here's how I fared with the Solo. After many calls to Gateway tech support (about half of which ended with the technician refusing to help), I discovered that Gateway had drivers for the ColorBook II that might enable the Solo's 800x600 graphics. After forging ahead despite many error messages, at last I was able to use all of the available screen resolution.

Sound was also a problem. While OS/2 Warp Connect came with drivers for the ESS Audiodrive chipset, these simply didn't work. I obtained partial functionality using a Sound Blaster driver (most sound chips today are Sound Blaster-compatible, so this trick frequently works). Later, I obtained a BIOS upgrade and a new ESS driver that enabled all the features of the chipset,

including Windows and OS/2 support.

The toughest nut to crack, however, was the Solo's PCMCIA hardware. A Gateway employee said she thought that the AST PowerExec driver had worked on the Gateway ColorBook II, and that the Solo used the same chipset. She proved correct, but I could not use the driver until I also implemented the *reserve.sys* fix. While the Solo uses the same PCMCIA hardware as the AST PowerExec (which I picked from the Selective Install dialogue), the machine refused to recognize PCMCIA cards properly, claiming that modems and Ethernet adapters were all memory cards!

After much persistence, I was able to speak to a Gateway design engineer, who verified that the Solo's PCMCIA interface used an engineering shortcut known as partial address decoding to save hardware. While the technical details of this technique are beyond the scope of this article, the net effect is that PCMCIA cards in the Solo can only be mapped to regions of memory that start on 16K byte boundaries—a requirement the drivers didn't know about. Adding

the line `BASEDEV=RESERVE.SYS /MEM=CA00,2000` at the very top of *config.sys* solved the problem by bumping the address of the first card from segment CA00 to CC00.

At last, all of the Solo's hardware was running properly with no glitches; I immediately performed another backup. The tape went into a safe deposit box, where it sits in case of future problems.

Worth the effort

As you can see, getting OS/2 running on hostile hardware isn't always easy. But it is usually possible, and if you persevere, it's well worth the effort. The advent of OS-independent driver standards and plug and play may soon allow users to avoid such travails and install any OS—including OS/2—without problems. But until that day arrives, the tips and tricks mentioned here are the best way of ensuring a successful installation.

OS/2

Brett Glass writes the Help Desk advice column in Infoworld magazine. E-mail him at rogue@well.com.

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Introducing DCE

Distributed Computing Environment extends client/server.

By Steven Gardner

When moving to the world of network-centric computing, one of the necessary sacrifices is to leave the comfort and familiarity of the platform you know and venture out into the world known as distributed computing. Distributed computing extends the more familiar client/server model by separating application development from the underlying communications and data provider services. One of the key benefits of distributed systems should be the ability to utilize different vendors' software and hardware platforms effectively.

Sounds great—but the biggest obstacle we face in trying to solve the problems associated with distributed computing has been a secret (or not so secret) desire by most vendors to own the specifications and standards upon which the platform is built. This desire has contributed to an explosion of proprietary standards and created many problems in getting different vendors' systems to talk to each other.

One of the emerging standards is the Distributed Computing Environment (DCE) from the Open Software Foundation (OSF). DCE is different from earlier systems in that no single vendor owns the specification: DCE is owned by the OSF, which is itself a nonprofit consortium with over 380 members, including corporations, government agencies, and academic institutions. OSF's primary function is to research and develop vendor-neutral, open-systems software technologies that are distributed as source code to its members. OSF also certifies each vendor's implementation of a product.

DCE also placed as its highest priority the ability to interoperate seamlessly across heterogeneous networked environments. DCE includes several technologies that were already proven by the various OSF members. A DCE client application need only be recompiled on the client's environment to access a matching DCE server running on any supported platform.

What is DCE?

DCE isn't a network operating system in the traditional sense, so it's not something like OS/2 Warp Server or Novell NetWare. Rather, it's a collection of services that provide distributed network management facilities and a consistent development environment across a wide variety of different vendor hardware and operating systems.

DCE is composed of six components. The first five of these components provide the necessary tools for developing applications and managing end users in a distributed system. They are: the Remote Procedure Call; Distributed Directory Service, including the Global Directory Service and the Cell

Directory Service; Distributed Security Service; Distributed Time Service; and finally, the Threads Service. The sixth component, the Distributed File System, primarily supports data-sharing activities.

Remote Procedure Call (RPC). RPC is based on the normal C language procedure call with which programmers are already familiar. RPC distributes applications by individual procedures to be executed anywhere in the network. It also masks the complexities inherently involved in network programming and allows the application programmer to utilize functions available on any platform connected to the network.

RPC is tightly integrated with the other DCE services. Clients locate servers by names that are stored in the Directory Service. Secure RPC is accomplished by using the Distributed Security Service to provide user-authentication, authority, and encryption services. Integration with the Threads Service gives servers the ability to handle multiple clients and lets clients access multiple servers simultaneously. Because DCE was designed to run on multiple protocols, rewriting applications when the transport layer changes is no longer necessary.

Distributed Directory Service. The DCE Distributed Directory Service is comprised of two separate, yet tightly integrated services. The Global Directory Service (GDS) and Cell Directory Service (CDS) combine to offer full X.500 functionality and the speed and flexibility of a replicated local naming system.

The GDS and the CDS facilitate access to any network resource by providing a single naming convention that allows users and applications to locate files, servers, printers, or any other network resource by name. This naming convention also provides system administrators the ability to change or add network resources without the fear that applications will no longer function.

GDS provides all the functionality of a full X.500 implementation by using the X/Open Directory Service API. GDS is the mechanism that connects all the cells of a DCE network together and allows cross-cell communication. CDS provides a local namespace for a DCE cell. A DCE cell is merely a collection of nodes or network resources that are administered as a single unit. Cell performance can be improved by name caching and by replicating the CDS to additional CDSs in the same cell. Changes are automatically replicated to the other CDSs in the cell.

Replicating the CDS also assures that critical system services will still be available even if there is a hardware failure. In addition, the DCE Distributed Directory Service integrates

the Distributed Security Service, providing authentication and authorization services for every name entry in the CDS.

Distributed Security Service (DSS). Because a distributed system can provide many services from many different platforms, a single common security system accessible by the entire network is required. The other major problem is that in a distributed system, one must assume that system access may be compromised at any time. DSS, based on the trusted third-party security system, Kerberos, developed by MIT's Project Athena, provides authentication, authorization, access control, and a user registry.

The authentication service verifies that the user has entered a valid ID and password. Since the password isn't transmitted across the wire, there is no chance that passwords can be intercepted by network intruders. The password is also deleted from the computer's memory after login. After login is completed, the user receives a Ticket containing a Privilege Access Certificate (PAC), which is used by other services on the network to verify authorization and access control.

The other major problem for distributed systems is that any user can access the network from any computer on the network. This capability is necessary to support users' access to the distributed network, especially when the network is scattered across many sites.

The authorization service provides a means for other services on the network to determine whether the user is authorized to use the requested service. Access control then helps each service determine the user's type of access. For instance, a user may be allowed to view inventory data but not allowed to edit the data.

Finally, DSS provides a single repository to create and maintain user account information accessible from anywhere on the network. Like the other DCE services, DSS can be replicated to provide both performance improvements and easy recovery should a hardware failure occur.

Distributed Time Service (DTS). Because a distributed system is composed of many computers and may be dispersed across multiple time zones, a consistent and reliable method for regulating the system clocks for all the computers in a network is necessary. This synchronization is especially critical for services that are time and date dependent, such as scheduling applications and file systems.

DTS generally consists of three or more servers connected to an accurate external time source, such as an Internet Network Time Provider. DTS then synchronizes the system clock of each network node by speeding up or slowing down the computer's clock. This method prevents sudden jumps forward or backward in the nodes clock. DTS requires very little administration or support.

DCE Thread (PThreads) Service. PThreads, named for the POSIX standard from which it originated, is not inherently a distributed service. It is included in DCE to provide a consistent interface for the application developer. Thread services support concurrent program execution on any DCE platform, which is especially useful because it enables a single-server process to support multiple clients simultaneously. For operating systems that support Kernel-Based Threads, like OS/2 and AIX 4.1, these APIs are mapped to the operating system's APIs.

Distributed File System (DFS). Unlike the other services, DFS is a data-sharing service that allows network-wide access to any file on any network node. Files and directories can be replicated on multiple machines, providing improved performance and recoverability in case of hardware failure. Files are transported across the network using Secure RPCs, and access can be controlled using the DSS access control lists. DFS also provides a gateway to interoperate with Sun's Network File System (NFS). As a bonus for OS/2 users, DFS also supports extended attributes.

Diskless Support (DS). DS is another data-sharing service that provides general-purpose protocols to support diskless workstations on the network.

A new way of thinking

While new innovations are making DCE more powerful and easier to use, implementing DCE requires a new way of thinking about your network. Programming DCE applications still isn't a simple task, and the learning curve can be substantial; but in the long run, the benefits of interoperability across a heterogeneous network are enormous. For the first time, platforms from multiple vendors can work

DCE on OS/2

As we go to press, IBM currently has two DCE-based products in beta. The first is DCE 2.1 for OS/2, based on OSF's DCE 1.1. This product contains servers for Cell Directory Service, Distributed Security Service, Distributed Time Service, and the client for the Distributed File System. It does not include a Global Directory Service server, but it will include a Global Directory Agent, which can connect to a GDS server or to other CDS servers.

IBM has also developed a set of powerful GUI administration tools that fully exploits the Workplace Shell, much like the OS/2 Warp Server administration GUI. IBM has also added many other features, including Generic Security Services API (GSS-API), an industry standard API for accessing security services; Tool Command Language (TCL—pronounced "tickle"), a platform-independent command processing language; and Extended Attributes, which provides the ability to add custom attributes to the DCE Registry.

The second IBM product currently in beta is the IBM Directory and Security Service (IBM DSS), part of "Project Eagle" (see "Dateline: OS/2," June 1996, pp. 12-14)—not to be confused with the Distributed Security Service in DCE. This product adds and integrates the core DCE services, including CDS, GDA, DSS, and RPC, to the IBM LAN Server 4.0 and IBM Warp Server products. A great deal of work was put into creating a set of migration utilities that greatly simplifies the integration of existing LAN Server Domains. DSS facilitates the management of much larger networks. It also changes current file and print servers into DCE resources and instantly connects and interoperates with any other DCE network. In the past, implementing DCE networks has been complicated and difficult. Both of these products will make it a much simpler task.

Need something today? IBM currently sells Attachpack for OS/2 Warp Connect. This package contains the current DCE client for OS/2 and will be updated to support the new version of DCE for OS/2. The OS/2 DCE Client is also currently available and will be updated when the new release is ready. In a future release of OS/2, although probably not Merlin, IBM has announced plans to include the DCE client as one of the basic networking features.

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together, creating a very powerful computing platform. Services can be provided anywhere on the network with security and scalability in an easily managed environment.

Whether you're looking at IBM's DCE stand-alone product or at its implementation as part of the Director and Security Service Server (part of Project Eagle), DCE offers great benefits for the world of distributed computing. **OS/2**

Steven Gardner is the president of CyberWorks Corp. located in Dallas/Fort Worth, Texas. CyberWorks specializes in distributed object-oriented systems design and development. He can be reached at (817) 371-8489 or steve@cyberwks.com.

Resources:

Open Software Foundation's DCE
WWW <http://www.osf.org/dce>

IBM PSP Beta Information
WWW <http://www.austin.ibm.com/psinfo/betahome.html>

Proven Solutions for Technology's DCE
WWW <http://www.csc.ibm.com/advisor/provensolutions/1sttedc.html>

Center for the Application of Information Technology
WWW <http://www.cait.wustl.edu/infosys.html>

OSF DCE — Guide to Developing Distributed Applications, Lockhart, (McGraw Hill, 1994), ISBN 0-07-911481-4

Guide to Writing DCE Applications, Shirley, Hu, & Magid, (O'Reilly & Associates Inc. 1992, 1994), ISBN 1-56592-045-7

Understanding DCE, Ward, Kenney, & Fisher, (O'Reilly & Associates Inc. 1992), ISBN 1-56592-005-8

DCE Security Programming, Wei Hu, (O'Reilly & Associates Inc. 1995), ISBN 1-56592-134-8

OSF DCE Series (Introduction to OSF DCE, OSF DCE Users Guide and Reference, OSF DCE Administration Reference, OSF DCE Application Development Guide, OSF DCE Application Development Reference, Application Environment Specification (AES) - Distributed Computing), (Open Software Foundation)

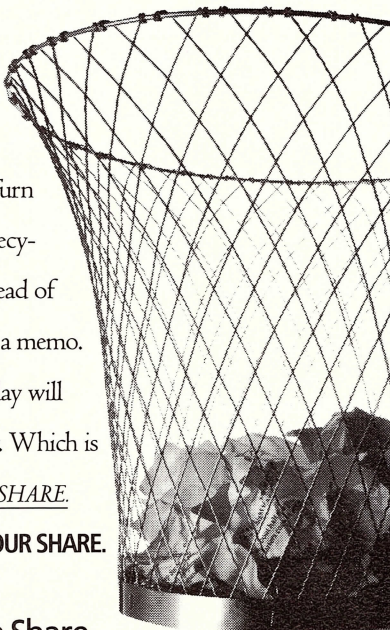
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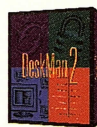
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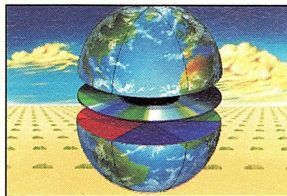
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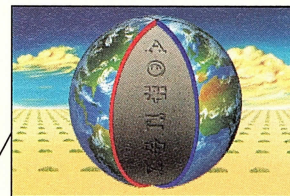
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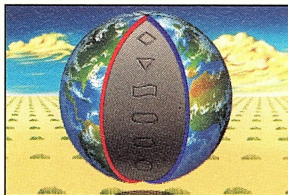
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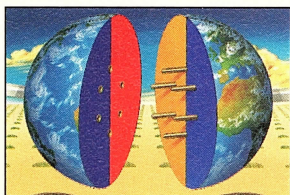
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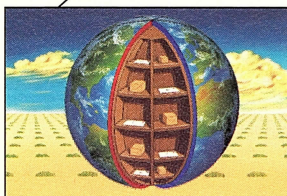
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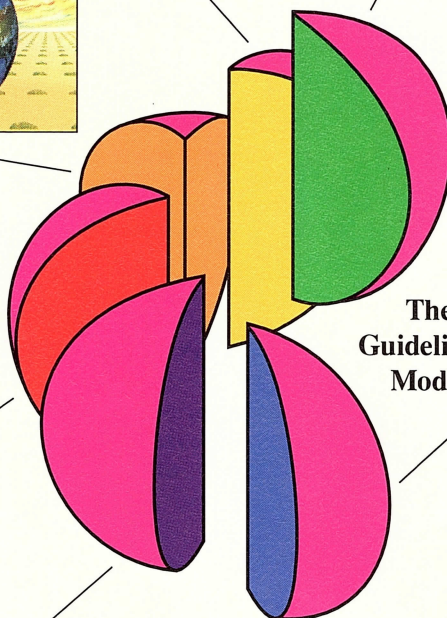
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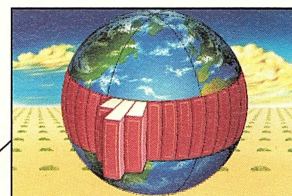
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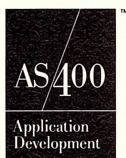
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The Miracle Heap

How to build a memory heap that really works. By Gordon W. Zeglinski

Memory problems? They're everywhere, and it seems that all C/C++ programmers eventually throw up their arms in frustration while trying to debug them. Why? There are just too many ways to corrupt the memory heap. You might free an invalid pointer, overwrite the end of the allocated memory block, underwrite the start of the allocated block, or just randomly write into the wrong memory location.

Ideally, the heap should have functions for tracking down sources of corruption or memory leaks. Unfortunately, most compilers don't ship with a debug-friendly heap. When they're available, the decreased performance is often too significant, and the resulting program is unusable. When code has to be compiled by several compilers, using the same heap on each compiler can help reduce the programmer's search space when looking for bugs. Recently I had need of a "miracle heap" that would be fast, stable, and portable, and was forced to develop one. Based on what I learned, we'll see how you can create your own.

Memory management basics

First, let's look at how OS/2 handles memory allocation. In OS/2, memory is not committed when it is allocated, and once it is allocated it can't be reallocated. Thus, a heap should allocate a large block of memory at startup and commit this memory as needed. The memory block is divided into 4K pages. These pages can be committed and decommitted. When committed, the page is mapped to physical memory. If the application needs more heap space than initially allocated, the heap needs to be able to allocate new memory

blocks and "chain" them to the existing heap structures.

Let's look at the APIs used to work with memory. We use the function **DosAllocMem** to allocate our block of memory. Once allocated, we have two ways of committing the memory. We can use **DosSetMem** to commit the pages manually or **DosSubSetMem** to set up the memory block for suballocation more automatically. OS/2 will handle the committing and decommitting of pages for the suballocated memory block. We use **DosFreeMem** and possibly **DosSubUnsetMem** to release the block of memory. **DosSubUnsetMem** is used only if **DosSubSetMem** was used. Listings 1 and 2 show both methods of allocating memory.

In Listing 1, we manually commit the memory using **DosSetMem**. In line 1, we request 4MB of memory from OS/2. The flags **PAG_READ**, **PAG_WRITE**, and **OBJ_TILE** tell OS/2 that the memory block is to be readable, writeable, and accessible by 16-bit code. In line 2, we commit the first page of the requested memory block. The first argument of **DosSetMem** should fall on a page boundary. Line 3 simply memsets 1K of memory from the committed page to verify that the page was indeed committed. In line 4, the block allocated by **DosAllocMem** is returned to OS/2.

Now on to memory suballocation: In Listing 2, line 1 allocates a block of memory (the memory pool). In line 2, this block of memory is prepared for suballocation, specifying that OS/2 is to handle the commitment of pages. Line 3 suballocates a block of memory. Line 4 verifies that the block has actually been committed. Line 5 frees the suballocated memory block. Line 6 undoes **DosSubSetMem**. Finally, line 7 frees the memory pool.

Listing 1: Using the basic OS/2 memory management functions.

```
#define INCL_DOSMEMMGR
#include <os2.h>

int main(){
    VOID    *MemBase;

    DosAllocMem(&MemBase,4*1024*1024,PAG_READ|PAG_WRITE|OBJ_TILE);           //1
    DosSetMem(MemBase,4*1024,PAG_COMMIT|PAG_READ|PAG_WRITE);                 //2

    memset(MemBase,0xff,1024);                                                //3
    DosFreeMem(MemBase);                                                       //4
}
```


Listing 2: Using memory suballocation in OS/2.

```
#define INCL_DOSMEMMGR
#include <os2.h>

int main(){
    VOID    *MemBase;
    VOID    *AllocMem;

    DosAllocMem(&MemBase,4*1024*1024,PAG_READ|PAG_WRITE|OBJ_TILE);           //1
    DosSubSetMem(MemBase,DOSSUB_INIT|DOSSUB_SPARSE_OBJ,4*1024*1024);        //2

    DosSubAllocMem(MemBase,&AllocMem,1024);                                  //3
    meset(MemBase,0xff,1024);                                                //4
    DosSubFree(MemBase,AllocMem,1024);                                       //5
    DosSubUnsetMem(MemBase);                                                 //6

    DosFreeMem(MemBase);                                                     //7
}
```

Heap design

Let's move on to some heap design issues. Several design choices can be made here. The most common heap design uses linked lists in the heap itself to keep track of memory blocks. Alternatively, arrays can be used to store allocation information. The advantage of using the later approach is that the heap is more resistant to corruption due to an application overflowing an allocated memory block. The structure of a typical linked-list heap is:

```
[Block Size][memory block]
[Block Size]
[Block Size][memory block]
[Block Size]
...
```

A single entry in the heap is composed of a block of application-usable memory and two block-size parameters. The block-size parameters indicate the size of the memory block they surround. The heap itself is composed of multiple-heap entries. Also, the [Block Size] entries are easily damaged by memory overwrites.

Adding overwrite checking to the heap is easy. Sentinel bytes are added to the head and tail of the allocated block. The linked-list heap structure with overwrite checking is:

```
[Block Size][Head Sentinel]
[memory block][Tail
Sentinel][Block Size]
[Block Size][Head Sentinel]
[memory block][Tail
Sentinel][Block Size]
...
```

The value of the sentinel blocks can be checked periodically to determine if they have changed from the preset value. If they have, then the application is overwriting memory.

Let's stop for a second and review what we have so far. The heap design so far is based on a linked-list structure and allows the detection of memory block overflows. However, we need to determine where the memory block was allocated. To do that we modify the heap entry layout (Listing 3).

In Listing 3, the [Alloc Info] heap entry parameters are pointers to

AllocInfo structures. These structures can be allocated from a second heap or from the primary heap.

To get the file and line info easily, we define macros for **malloc**, **realloc**, **calloc**, and **free**. These macros, shown below, trick the preprocessor into passing the file and line information to our debug heap functions wherever we used the regular heap functions (**malloc**, **realloc**, **calloc**, **free**).

```
#define malloc(arg)
    debug_malloc
    (arg,_FILE_,_LINE_)
#define realloc(arg1,arg2)
    debug_realloc(arg1,
    arg2,_FILE_,_LINE_)
#define calloc(arg1, arg2)
    debug_calloc(arg1,arg2,
    _FILE_,_LINE_)
#define free(arg) debug_free
    (arg,_FILE_,_LINE_)
```

Building a better heap

Using this information, you can create your own heap from scratch—but that's not absolutely necessary. If you don't have the time to write a heap or the

Listing 3: Debug heap with heap entry owner information.

```
typedef struct __AllocInfo__ {
    int    Line;
    size_t Len;
    char   File[1];
} AllocInfo, *pAllocInfo;

[Block Size][Alloc Info][Head Sentinel][memory block][Tail Sentinel][Block Size]
[Block Size][Alloc Info][Head Sentinel][memory block][Tail Sentinel][Block Size]
...
```


Listing 4: debug_malloc and debug_free functions.

```
const unsigned long HeadMarker=0xF0F0F0F0;
const unsigned long TailMarker=0x0D0D0D0D;

void* debug_malloc(size_t size, char *File,int Line){
    size_t    MySize=size+sizeof(pAllocInfo)+2*sizeof(TailMarker);
    char      *Return;

    Return= (char*) malloc(MySize);
    if(Return){
        /*we get lazy here and assume malloc doesn't fail*/
        pAllocInfo Info=(pAllocInfo)malloc( sizeof(AllocInfo)+strlen(File));
        Info->Line=Line;
        Info->Len=size;
        strcpy(Info->File,File);
        *((pAllocInfo*)Return)=Info;
        Return+=sizeof(pAllocInfo);
        *((unsigned long*)Return)=HeadMarker;
        Return+=sizeof(unsigned long);
        *((unsigned long*)(Return+size))=TailMarker;
    }

    return Return;
}

void debug_free(void *Block, char *File, int Line){
    char      *MyBlock=((char*)Block) -sizeof(unsigned
                                long)-sizeof(pAllocInfo);
    pAllocInfo Info;

    Info=((pAllocInfo*)MyBlock);
    if( *((unsigned long*)(MyBlock+sizeof(pAllocInfo))) != HeadMarker) ||
        *((unsigned long*)(MyBlock+sizeof(pAllocInfo)+sizeof(unsigned
                                long)+Info->Len)) != HeadMarker) ){
        fprintf(stderr,"Memory block allocate in File: %s Line %i\r\n"
                "was overwritten. Free called from %s line %i\r\n",
                Info->File,Info->Line,File,Line);
    }
    free(Info);
    free(MyBlock);
}
```

money to buy one designed specifically to aid in diagnosing memory-related problems, using the compiler's existing heap will get you some debug ability. To do this, we use the four previously defined macros, and we implement the **debug_XXX** functions to which the macros map. Listing 4 shows sample functions for **debug_malloc** and **debug_free**. Implementing **debug_calloc** and **debug_realloc** is left as an exercise for the reader. By the way, the debug macros must not be defined in the source code module that implements the **debug_XXX** functions!

Most compilers allow the application to "walk the heap." However, the exact code to perform this function is compiler-specific and will not be presented here. The reader must determine precisely how to walk the heap with the

compiler being used. And why would we want to walk the heap?

The reason is to help find memory leaks. At some point in the program where the application is terminating—say, at the end of **main()** or in an exit handler—the program walks the heap and lists out the information in the info blocks. This gives us the exact location where the block was allocated. Using this knowledge, the programmer can then set about plugging the memory leak.

We have now covered enough material for adventurous programmers to build their own heaps or add debug capability to the compiler's existing one. For those who are more pragmatic, a list of features to look for in a debug-friendly heap was given at the start of this article. While not strictly

related to debugging, the ability to have multiple heaps within an application is a big plus. In OS/2, having a heap per thread or group of related threads can improve application performance and stability (with the use of exception handlers). **OS/2**

Gordon Zeglinski is a founding partner of Adeptsoft. For the past 14 years, he has been developing applications and has been developing for OS/2 since 1992. During this time, he has worked on projects ranging from C++-based sparse matrices, to OS/2 device drivers, to OS/2 communications programs. Gordon was the first columnist for EDM/2 and has been writing OS/2 programming columns for the last three years. You can reach him at zeglins@cc.umanitoba.ca.

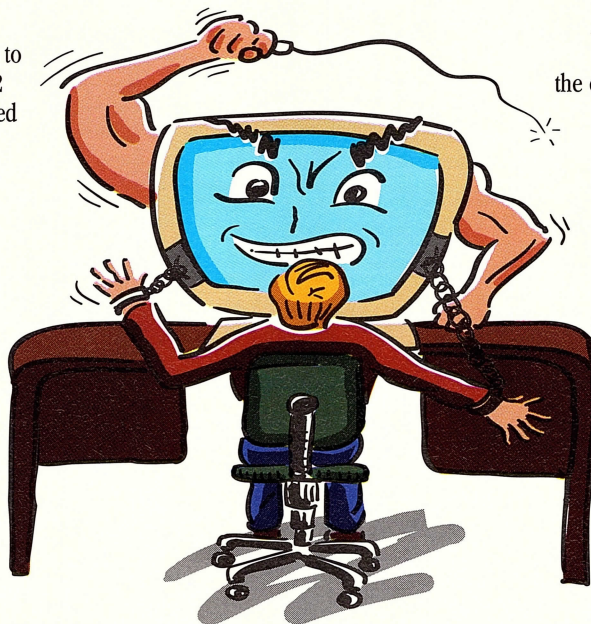
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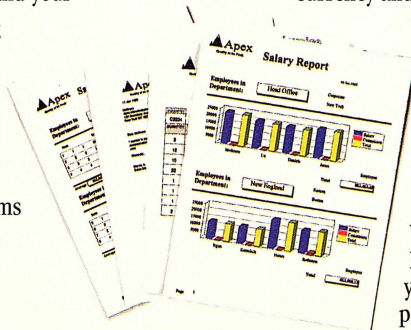
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Developing and Using OpenDoc Extensions

Objects, extensions, plug-ins, and more! By **Emily A. Vander Veer**

OpenDoc is a cross-platform, component-based architecture designed to let developers create software components that interact consistently through a set of standard APIs. In an OpenDoc document or application, this interaction provides the glue that binds component building blocks into complete software solutions. Think of a stereo system: as with stereo receivers, turntables, and speakers from different manufacturers, OpenDoc components produced by various developers can be interconnected to build functional systems because their interfaces are based on open standards.

One of OpenDoc's most compelling features is its extensibility. OpenDoc is essentially a framework for persistent, visible, interactive components; it doesn't mandate specific implementation details. It does, however, provide a technique for developers to define, implement, and enforce such details. Every OpenDoc object—specifically, every object that ultimately derives from **ODObject**—can be extended by a developer. These objects include components, or "parts," as well as OpenDoc service objects such as the clipboard, dispatcher, and session. By implementing extensions to OpenDoc service objects in conjunction with a run-time initialization entry point called a "shell plug-in," developers can actually extend the OpenDoc architecture itself. Extensions can be implemented privately, by developers producing a suite of interoperable parts; or publicly, to expose function for use by others. One of the benefits of implementing OpenDoc extensions is that now developers have a way to make their function easily accessible to other developers and system integrators.

Let's explore the concept of OpenDoc extensions and shell plug-ins: what they are, when to use them, and how to design them. Sample code is included to demonstrate the programming effort required for each. We'll begin by examining how to implement, query, and access an interface extension. Then we'll take a look at how shell plug-ins can be used to time the creation of extensions and how this affects the availability of extensible objects.

Interface extensions

What we've been referring to as "extensions" are more accurately called "interface extensions." Their purpose is to extend an object's interface; that is, they allow objects to expose custom interfaces and communicate through them to other objects in a well-defined way. While interfaces can be exposed without using extensions, extensions allow them to be organized in a meaningful way and added to objects in groups. These sets of behaviors are implemented as objects themselves; that is, they can be queried, reused, inherited from, and so on. Therefore, once a set of behaviors is developed and tested, it can then be used to extend any other object.

An example of the type of function an extension can be used to implement is the ability to respond to speech input. Once the problem is solved for one part, the solution can be applied to any other. The resulting extension object actually becomes a mini-software developer's kit that makes it easy for other part developers to incorporate speech capability into their applications.

Other examples include the semantic interface extension, which supports scripting, and the menu extension, which allows parts to collaborate on part-spanning menus. These objects, along with the settings and view extensions and sample parts that exploit them, are part of the OpenDoc for OS/2 toolkit and are useful as guides for custom implementations. (For more detailed information, see the class descriptions of **ODSemanticInterface**, **ODMenuExtension**, **ODSettingsExtension**, and **ODViewExtension** in the *OpenDoc for OS/2 Programmer's Reference*.)

As noted above, implementing the semantic interface extension and responding to semantic events defines an object as "scriptable." This extension offers a ready-made means of implementing part interaction and is often recommended for this purpose. While the extension can play a very important role in the development of OpenDoc solutions, however, it does not provide a one-size-fits-all approach. The

Some OpenDoc Definitions

OpenDoc extension: A class derived from `ODExtension` that defines a set of logically related behaviors implemented as methods. When attached to any other OpenDoc object, an extension serves to extend the capabilities of the base object. An OpenDoc extension is itself an object that can be reused, modified, inherited from, and so on. Also called an interface extension.

OpenDoc base object: Any OpenDoc object that uses an extension. Base objects must implement the **HasExtension**, **AcquireExtension**, and **ReleaseExtension** APIs in order to communicate to other objects that an extension is attached and available.

Shell plug-in: An entry point into the OpenDoc document instantiation process. A shell plug-in is invoked by the document shell prior to the instantiation of any OpenDoc part. Shell plug-ins can contain any logic, including (but not limited to) the implementation of OpenDoc extensions.

Part: An OpenDoc component. A part consists of methods and data. The methods are collectively called a "part handler;" the data refers to part content. For example, an instance of a text-processing part comprises the text-processing application code (part handler) and the text being manipulated (the data).

Part handler: Often used interchangeably with "part" but actually denotes the application code that handles the instance content of a part.

Document shell: The run-time instantiation of an OpenDoc document. The document shell owns the process associated with the document and provides run-time services, including initialization of the document's session and the invocation of shell plug-ins. Also called "docshell."

difference between modifying semantic interface extensions and "rolling your own" is one of performance and utility.

The primary benefit of subclassing and reusing the semantic interface is that it can be used to make a part scriptable; that is, to respond to events that have been specified, typically by a power user or system integrator, in a scripting language such as Object REXX. Because the design of this extension focuses on scriptability in favor of efficiency, its benefit comes at the price of non-trivial performance overhead. If high bandwidth, fast interaction, or specialized collaboration between objects are anticipated, creating and using an extension derived from `ODExtension` is better than subclassing the semantic interface extension.

There are three objects to be considered when implementing and using extensions: the extension itself, the base object (the object to be extended), and the calling object (the object that will be accessing the extension).

Extension. The extension must inherit from `ODExtension`, which is an abstract base class capable of maintaining associations to a base object and releasing resources, both its own and those associated to the base object. All

other functionality must be implemented in the derived class. The methods `ODExtension` defines include **BaseRemoved**, **CheckValid**, **GetBase**, **InitExtension**, and **IsValid**.

Keeping in mind that one of the primary benefits of implementing extensions is the ability to reuse them, it's important to design them as groups of meaningfully associated behaviors. Ideally, each of the methods in an

The primary benefit of subclassing and reusing the semantic interface is that it can be used to make a part scriptable; that is, to respond to events.

extension should relate to a single activity. It might help to make sure that a proposed extension can be described by the following sentence: "This extension allows <objects> to <have this ability>." For example, "This extension allows parts to be scriptable"; or "This extension allows parts to accept speech input."

Listing 1 shows the IDL file for the implementation of the **ODBaseSemanticInterface** extension. In this example we see that semantic interfaces can be extensions of any class

derived from `ODPart` or `ODSession`. (Remember that extensions in general can be attached to any object that inherits from `ODObject`.)

Base object. Whether the base object you choose derives from `ODPart`, `ODDispatcher`, or some other object, it is responsible for instantiating, managing, destroying, and providing access to any attached extensions. To that end, the object to be extended must create the extension and implement the **HasExtension**, **AcquireExtension**, and **ReleaseExtension** APIs defined in `ODObject`.

HasExtension, **AcquireExtension**, and **ReleaseExtension** all require an extension name as an argument. **HasExtension** returns a value of *true* if an extension with that name exists for the base object, and *false* if it does not. **AcquireExtension** returns the requested extension if it exists; if it does not exist, an exception is raised. **ReleaseExtension** does not return a value, but instead releases the specified extension if it exists or raises an error if it does not.

An extension is typically instantiated during the initialization routine (**InitPart** and **InitPartFromStorage** methods) of its base object. After both the base and the extension have been instantiated, the extension is available to other objects. The base object also takes care of destroying its extension and managing associated resources as appropriate.

Besides representing a logically cohesive set of behaviors, an extension also should be tied conceptually to its base object. In the case of semantic interfaces, if the goal of this extension is to make parts scriptable, it should be attached to a base descended from `ODPart`. In some cases, though, it will not be appropriate for a part to be an extension's base. For example, if a developer wants to log event activity for all parts, no one part should be extended. In this case, the dispatcher (an instantiation of `ODDispatcher`) should act as the base. As we will see shortly in our discussion of shell plug-ins, extensions to objects other than parts must be implemented in a slightly different manner.

Listing 2 shows an implementation of a base—a part called **KeyPadPart**—which supports the extension defined in Listing 1. **KPInitSemanticInterface** is called from **KeyPad**'s initialization methods (**InitPart** and **InitPartFromStorage**). **KeyPadPart** derives indirectly from **ODPart**.

Calling object. One of the benefits of using extensions is that it provides other developers with a way to query an object to see if it offers a specific integrated set of behaviors, rather than forcing them to ask the object if it supports each individual method call necessary to perform a task. To query the existence of an extension, the calling object must invoke the extended object's **HasExtension** method, passing the name of the extension it intends to use. If the **HasExtension** call returns *true*, the calling object next invokes the extended object's **AcquireExtension** method to get a reference to the extension. The caller is then able to make calls directly to this newly acquired extension object, which in turn forwards the calls to its base object.

When it no longer needs access to the called object's extension, the calling object should invoke the extension object's **ReleaseExtension** method. The extension calls the **ReleaseExtension** of its base object, which deletes the extension and frees up resources as appropriate.

Shell plug-ins

A shell plug-in is a mechanism that allows developers to implement extensions (or other functions) early in the document instantiation process, before any parts are instantiated. To understand the significance of this statement, let's look at the OpenDoc run-time process.

OpenDoc's document-centered approach is substantially different from the classic application-centered model (some prefer to view the approach as application-centered, where the document represents a specialized form of an application). The classic model focuses on an application—such as a word-processing application—which provides the address space for its own execution and manages memory for every document it creates. An OpenDoc document, on the other hand, may be composed of

multiple parts—specifically, part handlers—each of different types (like word processing, chart, spreadsheet, data feed, and so on).

Extensions implemented as shell plug-ins can extend the utility of the OpenDoc run time itself and operate on a document-wide basis.

OpenDoc part handlers can be compared to mini-applications in the classic model: applications because they define and implement behavior for a

specific type of content, and “mini-” because the standard tasks common to all parts contained in a document are managed not by any of the individual part handlers, but by a shared OpenDoc library called the document shell. Because the document shell (or “docshell”) handles file management, the event loop, printing, and interacting with system menus and dialog boxes, part handlers are free to concentrate on their value-add function. The centralization of these tasks by the OpenDoc architecture permits parts to be much more compact.

As owner of the process, the docshell instantiates and initializes itself before it instantiates any parts, even a root part. Shell plug-ins provide the ability to insert routines into this process. Extensions implemented as shell plug-ins thus have access to run-time objects that are unavailable by the time parts are instantiated. And because they are instantiated prior to any part, shell plug-ins can even be used to monitor and log activities related to the part creation process itself. A developer can choose to implement any function desired; implementing an extension is just one option.

Listing 1: IDL file for ODBaseSemanticInterface (semtintb.idl). The complete version of this file is shipped with OpenDoc for OS/2.

```
...
#include "Extensn.idl"
...
interface ODBaseSemanticInterface : ODExtension
{
    void InitBaseSemanticInterface(in ODPart base,
                                   in ODSession session);
    // the input parameters of InitBaseSemanticInterface
    // specify the "base" objects of this extension
...
#ifdef __SOMIDL__
    implementation
    {
        functionprefix = ODBaseSemanticInterface;
        override:
            somInit,
            somUninit,
            ...

        releaseorder:
            InitBaseSemanticInterface,
            ...
    };
#endif // __SOMIDL__
};
```


Listing 2: Code snippets from the .cpp implementation file for KeyPadPart. The complete OS/2 implementation for this class is available as part of a Redbook produced by IBM.

```
SOM_Scope void SOMLINK KPInitSemanticInterface(
    KeyPadPart *somSelf,
    Environment *ev)
{
    ...
    _fSemtIntf = new ODSemanticInterface();
    // ODSemanticInterface derives directly from
    // ODBaseSemanticInterface,
    // shown in Figure 1. above. This call instantiates
    // the ODSemanticInterface extension.

    _fSemtIntf->InitSemanticInterface(ev, somSelf,
                                      _fSession);
    // This call initializes the ODSemanticInterface
    // extension.
    ...
}

=====
SOM_Scope ODBoolean SOMLINK HasExtension(
    KeyPadPart *somSelf,
    Environment *ev,
    ODType extensionName)
{
    ...
    if (!strcmp(extensionName, kODExtSemanticInterface)) {
        // kODExtSemanticInterface is a constant defined
        // in the stdexts.xh header file

        return kODTrue;
    } else {
        // Check to see if the parent supports this extension
        return (KeyPadPart_parent_SimplePart_HasExtension(
            somSelf,
            ev,
            extensionName));
    }
}

=====
SOM_Scope ODExtension* SOMLINK AcquireExtension(
    KeyPadPart *somSelf,
    Environment *ev,
    ODType extensionName)
{
    ...
    if (!strcmp(extensionName, kODExtSemanticInterface)) {
        return _fSemtIntf;
        // return the extension we instantiated when
        // KeyPadPart was initialized
    }
    ...
}
```

You might think of shell plug-ins as allowing interface extensions to operate on a higher level than otherwise possible. Extensions implemented as shell plug-ins can extend the utility of the OpenDoc run time itself and operate on a document-wide basis. Because they are invoked prior to the instantiation of any part, they can also provide services

that aren't logically associated with any particular part. Examples of the type of function a shell plug-in extension might provide are the creation of dispatch modules to intercept and log user events before dispatching them, or the creation of focus modules for new types of events, such as speech input, so parts can identify and accept these events.

A basic rule of thumb is that an extension should be implemented as a shell plug-in if it's not tied conceptually to any specific part, but instead offers part-neutral utility (like a spell checker); or if it must exist before any part is instantiated.

The implementation of a shell plug-in is very straightforward. As shown in Listing 3, all a developer must do is define and export an entry point called **ODShellPlugInInstallProc** that contains the custom functionality. This method will be invoked via **Dos-LoadModule** by the docshell after it has initialized itself and its session, but prior to the instantiation of any parts. To be available to the docshell for invocation, a DLL containing a shell plug-in must reside in the **OpenDoc Shell Plug-In** folder (WPS object ID **OD_SHELLPLUGINS**) at run time. Although multiple shell plug-ins may exist, each must reside in its own DLL. Currently no method exists to specify ordering for the invocation of multiple shell plug-ins.

It's a wrap

OpenDoc extensions represent sets of behavior that can be added to an OpenDoc object and then modified, reused, queried, and accessed as necessary. Any object that inherits directly or indirectly from **ODObject** can be extended; this includes, but is not limited to, OpenDoc parts. Shell plug-ins provide a mechanism for hooking into the OpenDoc run time early in the document start-up process. Extensions implemented as shell plug-ins thus have the power to extend OpenDoc run-time objects; these extended objects then participate in the instantiation and management of OpenDoc parts, documents, and applications.

Understanding and using OpenDoc extensions are essential for the development of production-level, component-based OpenDoc for OS/2 applications. There is a tremendous amount of value in the ability to extend a part's interface in a reusable manner, or similarly to extend the functionality of the OpenDoc architecture itself. Developers, system integrators, and value-added resellers will be able to exploit such extensions in combination with other OpenDoc objects to create tightly integrated, cohesive applications

Listing 3: Code snippets from *smpshpin.cpp* and *smpdspm.def*, which contribute to the implementation of a shell plug-in that monitors messages passed through the OpenDoc dispatcher and then relays them to *PMPrintf*. Complete versions of these files are shipped with OpenDoc for OS/2.

```
// smpshpin.cpp
#ifdef _SHPLUGIN_
#include <shplugin.h>
#endif
...
extern C {
APIRET APIENTRY MyShellPlugInInstallProc( Environment*,
                                           ODDraft*,
                                           ODSHellPlugInActionCodes*);
}

APIRET APIENTRY MyShellPlugInInstallProc( Environment* ev,
                                           ODDraft* draft,
                                           ODSHellPlugInActionCodes* action)
{
    ODSession* session =
    draft->GetDocument(ev)->GetContainer(ev) \\ continued
    ->GetStorageSystem(ev)->GetSession(ev);

    ODDispatcher* dispatcher = session->GetDispatcher(ev);

    ODDispatchModule* dspmod = new SampleDispatchMonitor;
    // This call instantiates a monitor which is
    // implemented separately

    dspmod->InitDispatchModule(ev, session);
    // This call initializes the monitor

    ...
}

=====
(Name of file: SMPDSPM.DEF)

LIBRARY cntnrprt INITINSTANCE
DESCRIPTION 'Sample Shell Plug-In Class Library'
PROTMODE
DATA MULTIPLE NONSHARED LOADONCALL
EXPORTS
    ODSHellPlugInInstallProc = MyShellPlugInInstallProc
=====
```

with consistent user interfaces across parts.

OS/2

References

OpenDoc for OS/2 is available on IBM Developer Connection 9 Special Edition CD or download from: <http://www.software.ibm.com/clubopendoc/index.html>

OpenDoc for OS/2 Programming Guide (included in the OpenDoc developer toolkit)

OpenDoc for OS/2 Programming Reference

(included in the OpenDoc developer toolkit)

OpenDoc: An Introduction to Part Development (Redbook, IBM order #SG24-4673-00, pp. 79-80).

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My Girl Scouts Are Badder Than Your Girl Scouts

BY ROGER SESSIONS

Some of the best programming students I've taught have been 15- and 16-year old Girl Scouts. At this age they are old enough to deal with intellectual issues, but still young enough to have wonder. This is the general age of my daughter Emily's troop. When the troop leader (who also happens to be my wife, Alice) asked me to help them get their computer badge, I was delighted.

I had two meetings. The first was easy. We spent an hour on the Web learning to do searches and discussing censorship and an hour at our local computer store learning to configure systems. But this still left me a second meeting to fill.

I decided that I would use that meeting to teach them C++ and how to work with object frameworks. Now I know most adults spend years learning these topics, but I figured these girls had three advantages. First, they liked computers. Second, they had nothing to unlearn. Third,

nobody had ever told them these topics were hard.

I set up a simple game framework. The Girl Scouts then split into teams and programmed game players. The players then plugged into the game framework and played against each other.

The game was very successful. The girls developed some fascinating strategies, learned (with the help of some knowledgeable C++ programmers) to turn these strategies into algorithms, and then to turn those algorithms into working C++ objects. They also learned what it means to work within an object framework.

It occurred to me that this project would be even more interesting if opened up to a larger audience. So that is what I'm doing in this article. I invite all of my readers to program players for this framework, and we will have a large payoff.

I especially urge readers who are working with youth groups, such as Girl Scouts and Boy Scouts, to in-

volve their youth and help them to design strategies and submit players. Many of these groups offer computer badges, for which this project will probably make them eligible. To sweeten the pot, I am offering a first prize (\$100), second prize (\$50), and third prize (\$25) to the best submissions from youth groups. These prizes have been donated by Object-Watch Inc.

Here is the basic game setup. The name of the game is "Dog Meets Dog." The goal is to program various types of dogs. The framework will create one instance each of the various dog types, and then set up a series of rounds. In each round, two dogs will be chosen to play against each other. Each dog is told which dog it is playing against in that round. The dog then has to decide whether it will share or steal from the other dog. Both dogs make the decision. Both dogs are then informed of what the other dog decided.

In each round, the framework assigns payoffs to each dog. The unit of payoffs is dog biscuits. If both dogs decide to steal, each dog is awarded one dog biscuit. If both dogs decide to share, each dog is awarded three dog biscuits. If one dog steals and the other shares, the stealer gets five dog biscuits and the sharer none.

A full game consists of many rounds, many more rounds than there are dog objects. In the course of a game, each dog will meet each other dog many times.

I did not originate the idea for this game. I first ran into it in a book that was published several years ago,

Listing 1: Pseudo-code for the game framework.

```
initialize scores;
instantiate dogCollection;
fill dogCollection with all dogs playing;
repeat until (game-over) {
    get two dogs from dogCollection;
    get unique id from first dog;
    get unique id from second dog;
    ask first dog what it wants to do with second dog;
    ask second dog what it wants to do with first dog;
    compute scores;
    tell first dog what second dog did;
    tell second dog what first dog did; }
display scores;
```


The World of Objects

and one I consider highly influential in shaping my own philosophy. I am not going to give the reference now, because I want to encourage readers to develop their own game strategies rather than turn this into a research project. I will give the reference in a later article when I discuss the results of this contest.

Although I did not originate this basic game, I have added several features I believe to be novel. First, I have turned this into an object-oriented framework. Second, I have set up the players as instances of C++ classes and have programmed both the overall framework and the dog players in VisualAge C++ running on OS/2. Third, I have made the players dogs, which for some reason has never before been done.

The game framework is typical of many frameworks: it defines and implements an architectural framework in which objects operate and interact. The framework itself is a program. It instantiates specialized objects and coordinates their interactions. The pseudo-code for the game framework program is shown in Listing 1.

Two related interactions occur in each round of the game. In the beginning of the round, the dogs are asked what they want to do with their opponents. At the end of the round, the dogs are informed of what their opponents decided to do with them.

Each dog is assigned a unique, stable ID, which is a long integer. This ID is assigned by the framework at the time the dog is instantiated, and it never changes. The dogs are identified to each other by this ID. So when a dog is asked how it wants to interact with dog 14, it can base its decision on its history of previous interactions with dog 14. When the dog is told what dog 14 decided to do, it can make a note of that information to be used in future interactions when it meets dog 14 again.

The dogs are not told about interactions in which they did not participate; for example, dog 11 is not told

Listing 2: C++ Definition of a dog player.

```
typedef int dogBiscuits;
typedef enum resultType {share, steal} result;

class dog {
public:

    dog();
    // dog constructor.

    virtual char *IAmA() = 0;
    // Returns the class of the dog.

    virtual result meetOtherDog(
        int dogNumber) = 0;
    // Called by the framework to ask how this dog will
    // interact with the opponent in this round.

    virtual void thisIsWhatHappened(
        int dogNumber,
        dogBiscuits yourScore,
        result youDidThis,
        result otherDogDidThis);
    // Called by the framework to tell this dog what the
    // result of this round is.

    void yourNumberIs(int dogNumber);
    // Used by the framework to assign a unique id.

    int whatIsYourNumber();
    // Used by the framework to determine the unique id.

protected:
    virtual int howManyMeetingsWithThisDog(
        int dogNumber);
    // Returns how many meetings this dog had with a given
    // opponent.

    virtual void whatHappenedInPreviousMeetingWithThisDog(
        int dogNumber,
        int meetingNumber,
        result* youDidThis,
        result* otherDogDidThis);
    // Returns information about a particular meeting with a
    // given opponent.

    virtual dogBiscuits yourScore();
    // Returns the current score for the dog.
    // (Not used by the framework)

private:
    /* ... */
};
```


of the outcome between dog 12 and dog 3.

In an object-oriented framework, base classes are typically provided. These base classes contain both concrete methods (ones that have been fully implemented) and abstract methods (ones that have been defined but not implemented). The

abstract methods are the hooks by which programmers provide specialized objects.

As an example, let's look at the C++ definition of dog, shown in Listing 2. I have simplified the definition by showing only protected and public areas.

First of all, let's consider the purpose of the different protections. C++ provides three different protection types within a class definition. The *public* region defines information about the class that anybody can use. The *protected* region defines information that can be used only by methods in this class or derived classes. The *private* section defines information that can only be used by methods of this class (dog).

The dog's public region contains both virtual and nonvirtual methods. A virtual method can be overridden in a derived class. A nonvirtual

method cannot be overridden. If you are not familiar with the concept of overriding methods and polymorphism, see the February issue of *OS/2 Magazine* ("littleDogs, Polymorphism, and Frameworks," p. 46).

Two of the virtual methods are declared using the peculiar C++ syntax `=0` (for example, `IAmA()`). This syntax is used to declare an abstract virtual method.

So the dog methods have the following characteristics:

- They may be public or protected.
- They may be virtual or nonvirtual.
- They may be abstract or concrete.

Let's see how we make these choices.

Methods that will be called by the framework are public. An example of this is the method `meetOtherDog`, the method used by the framework to ask the dog how it wants to interact in this round. Methods that are used only within `dog` are private, and those intended for derived dog types are protected. An example of a protected method is `whatHappenedInPreviousMeetingWithThisDog`, a method intended to be used by the override of `meetOtherDog`.

Methods that the dog types either may or must override are virtual.

Methods that the dog types *may* override are concrete and virtual. An example of a method that the dog types may override is `thisIsWhatHappened`, the method used by the framework to tell the dog the result of the round. The base class provides a perfectly acceptable implementation of this but also allows the dog types to override it, if the programmer has a better idea.

Methods that the dog types *must* override are abstract and virtual. An example of such a method is `meetOtherDog`. The whole point of this game is for the dog to provide a different implementation of this method, so no default is provided.

Methods that the dog may not override are nonvirtual. Dogs are not allowed to change their IDs, so the methods that deal with IDs, such as `whatIsYourNumber` are nonvirtual.

A typical dog type will be relatively simple, overriding exactly two methods: `IAmA` and `meetOtherDog`.

Listing 3: Definition of niceDog.

```
class niceDog : public dog {
    char *IAmA();
    result meetOtherDog(
        int dogNumber); };
```

Listing 4: Implementation of niceDog.

```
char *niceDog::IAmA() {
    static char *myTypeIs =
        "niceDog";
    return myTypeIs; }
result niceDog::meetOtherDog(
    int dogNumber) {
    return share; }
```

Listing 5: Implementation of sneakyDog's meetOtherDog.

```
result sneakyDog::meetOtherDog(int dogNumber) {
    int totalMeetings;
    result IDid, otherDid;
    totalMeetings = howManyMeetingsWithThisDog(dogNumber);
    if (totalMeetings == 0) {
        return share; }
    whatHappenedInPreviousMeetingWithThisDog(
        dogNumber, totalMeetings, &IDid, &otherDid);
    if (IDid == share) {
        return steal; }
    else {
        return share; } }
```

Listing 6: Implementation of unforgivingDog's meetOtherDog.

```
result unforgivingDog::meetOtherDog(int dogNumber) {
    int totalMeetings, n;
    result IDid, otherDid;
    totalMeetings = howManyMeetingsWithThisDog(dogNumber);
    if (totalMeetings == 0) {
        return share; }
    for (n=1; n<=totalMeetings; n++) {
        whatHappenedInPreviousMeetingWithThisDog(
            dogNumber, n, &IDid, &otherDid);
        if (otherDid == steal) {
            return steal; } }
    return share; }
```


IAmA is used by the framework to determine the class of the dog. **meetOtherDog** is used to determine the dog's decision on the round.

A typical example of a dog type is **niceDog** (Listing 3). Like all players, **niceDog** is derived from our framework-provided **dog**. As you can see, the actual work involved with defining a new dog type is much less than you would expect from the dog discussion. Notice that while **niceDog** doesn't say anything about overriding the **meetOtherDog** method, this is implied by the fact that the base class declared the method virtual.

niceDog uses one of the simplest possible algorithms in its implementation of **meetOtherDog**. Its code is shown in Listing 4. It always shares. We might rename **niceDog** to be **patsyDog**.

I have also implemented a **badDog**, a dog that always steals.

Most dogs will base their decision on whether to share or steal with a particular dog on information about previous encounters with that dog. The protected virtual methods defined for **dog** are provided for that purpose. One example of such a dog is **sneakyDog**, who always does the reverse of what he did last time he met that dog. If last time he shared, this time he steals. **sneakyDog**'s implementation of **meetOtherDog** is shown in Listing 5. **sneakyDog** is one of the dogs the Girl Scouts invented.

sneakyDog bases his share/steal decision only on the last interaction with the other dog. **unforgivingDog** looks through the entire previous history of interactions with the other dog. If the other dog ever stole, then **unforgivingDog** steals. She never gives you another chance. Her implementation is shown in Listing 6.

Notice that both **sneakyDog** and **unforgivingDog** make extensive use of the protected dog methods. None of the dog implementations shown here take advantage of the opportunity to override these methods. I don't see why anybody would want to override these, but I also don't want to eliminate the possibility.

Let's look at a few rounds of this game. Figure 1 shows six rounds and

Figure 1: Six rounds of dog meets dog.

1. **nice dog meets unforgiving dog**
 nice dog shares; unforgiving dog shares
 nice dog +3; unforgiving dog +3;
 (The only possible outcome between these two dogs)
2. **nice dog meets bad dog**
 nice dog shares; bad dog steals
 nice dog +0; bad dog + 5
 (The only possible outcome between these two dogs)
3. **unforgiving dog meets bad dog**
 unforgiving dog shares; bad dog steals
 unforgiving dog +0; bad dog + 5
 (Unforgiving dog hasn't learned about bad dog yet)
4. **unforgiving dog meets nice dog**
 nice dog shares; unforgiving dog shares
 nice dog +3; unforgiving dog +3
 (The only possible outcome between these two dogs)
5. **bad dog meets unforgiving dog**
 bad dog steals; unforgiving dog steals
 bad dog +1; unforgiving dog + 1
 (unforgiving dog will never forget round 3)
6. **unforgiving dog meets sneaky dog**
 unforgiving dog shares; sneaky dog shares
 unforgiving dog +3; sneaky dog +3
 (sneaky dog starts out nice, but it won't last)

Scores at the end of round 6:

nice dog:	6
unforgiving dog:	10
bad dog:	11
sneaky dog:	3

(of course, the game is young)

the decisions each dog makes based on their own implementations of **meetOtherDog**. Notice that the framework instantiates only one of each dog type.

This should give you an idea of the game. Now it's your turn. Can you beat **puddingHeadDog**, another of Troop 161's inventions? Or how about **jeanBobDog**? (This is a Texas troop!)

Fine Print

OK. Here is the deal:

1. All entries must be e-mailed to roger@fc.net before September 1st. All entries must have a return e-mail address.

2. All entries must compile on VisualAge C++ on OS/2 without warnings or errors. I will not fix errors or warnings.

3. In the event that I am inundated with entries, I reserve the right to limit the contest to the first 50 entries from youth groups.

4. One instance of each dog will be instantiated and played against each other dog. Each dog will play against each other dog at least five times, perhaps much more.

5. An entry consists of a header file (similar to Listing 3) and an implementation file consisting of code for IAmA, modeled after the

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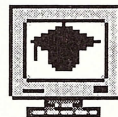
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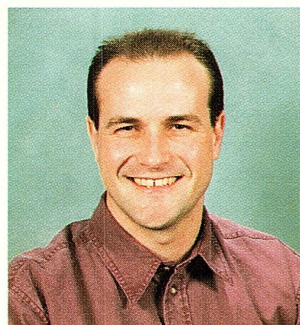


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CTLDATA: Lazy Programming

BY MARK BENGE AND MATT SMITH



Last issue, we began our look into custom controls, focusing on the creation of the control. To continue along those lines, we will look at a very powerful and poorly understood area of controls, **CTLDATA**. This construct, which can take different forms for each control, is in effect a lazy programming technique. This fits in purrfectly with our attitudes and tendencies for power naps...

In the beginning...

Let's look a little further at the **WM_CREATE**. Remember, last time we mentioned that message parameter (mp1) contained a pointer to the **CTLDATA** for the control. Now, **CTLDATA** is not a given for a con-

trol. As you can see in Table 1, some of the OS/2 PM controls have **CTLDATA** and some don't.

Now, you may be wondering just what is the purpose of the **CTLDATA**, and why do we like it so much? Well, in a nutshell, it contains information to set up a control such that we don't need to write as many lines of source code. Also, it allows you to change the characteristics of the control just through your resources without having to change and recompile your source code. In other words, it is a neat way to lighten the workload!

Let's look at a good example: the entry field. The control data, **ENTRYFDATA**, is defined in Listing 1.

The first field, **cb**, is used to hold the size of the structure, which

should be 12. The second field, **cchEditLimit** is used to specify the number of characters that can be entered within the entry field. By default, when an entry field is first created, it can have up to 32 characters entered within it. You would usually change this limit by sending an **EM_SETTEXTLIMIT** message to the entry field with the new limit.

The third field, **ichMinSel**, is used to set the starting index for the selected text of the entry field. The fourth field, **ichMaxSel**, is used to set the ending index for the selected text. You would use the message **EM_SETSEL** to select the desired range.

The final field, **pHWXCtlData**, is used in conjunction with Pen for OS/2. It either contains a pointer to a

Table 1: CTLDATA use.

Control	CTLDATA Structure
Buttons	BTNCDATA
Circular slider	
Combo box	COMBOCDATA
Container	
Entry field	ENTRYFDATA
Graphical button	GBTNCDATA
Handwriting	HWXCtlDATA
List box	
MLE	MLECTLDATA
Notebook	
Scroll bar	SBCDATA
Sketch	
Slider	CLDCDATA
Spin button	SPBCDATA
Text	
Value set	VSCDATA

Listing 1: ENTRYFDATA definition and sample use.

```
typedef struct _ENTRYFDATA /* efd */
{
    USHORT cb; /* Structure size (in bytes) */
    USHORT cchEditLimit; /* Entry field size */
    USHORT ichMinSel; /* Selection start */
    USHORT ichMaxSel; /* Selection end */
    PVOID pHWXCtlData; /* Pen CTLDATA pointer */
} ENTRYFDATA;

ENTRYFDATA efd;

efd.cb = sizeof(ENTRYFDATA);
efd.cchEditLimit = 128;
efd.ichMinSel = 5;
efd.ichMaxSel = 10;
efd.pHWXCtlData = NULL;

WinCreateWindow(hwndParent, WC_ENTRY, "Default text",
    WS_VISIBLE | WS_TABSTOP | ES_MARGIN | ES_AUTOTAB, 10L,
    10L, 150L, 25L, hwndOwner, HWND_TOP, 1024UL,
    (PVOID)&efd, NULL);
```

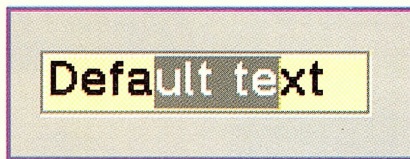



Figure 1: Entry field.

Pen for OS/2 CTLDATA structure or the start of the control structure. This one field is a wee bit messy, so we won't discuss it in detail here, though we will comment on it later.

So, if you wanted to change the default entry field size and preselect a portion of the text within the entry field, you would do this within your source code after the control has been created:

```
WinSendMessage(hwndEntry,
    EM_SETTEXTLIMIT,
    MPFROMSHORT(128), 0L);

WinSendMessage(hwndEntry,
    EM_SETSEL, MPFROM2SHORT(5,
    10), 0L);
```

Alternatively, you could, at the time the control is created, complete the ENTRYFDATA structure and use it with the WinCreateWindow function as shown in Listing 1.

That's great! But what we are showing here will only work if we create the control ourselves at run time. What about our entry fields within our resources?

Well, not to worry, the designers of the OS/2 PM resources took this into consideration, and if you look closely at the statements of the resource compiler, you will see a CTLDATA statement. Just the cat's meow!!

So, the same entry field, if created through the resources of a dialogue, would look like:

```
CONTROL "Default text",
    1024UL, 7L, 5L, 100L, 12L,
    WS_VISIBLE | WS_TABSTOP |
    ES_MARGIN | ES_AUTOTAB

CTLDATA 12, 128, 5, 10, 00,
    00
```

You will notice a slight difference in the position and size within the resource script file statements. That is because the units used within the WinCreateWindow API is pels, while the units within the CONTROL statement is dialogue units.

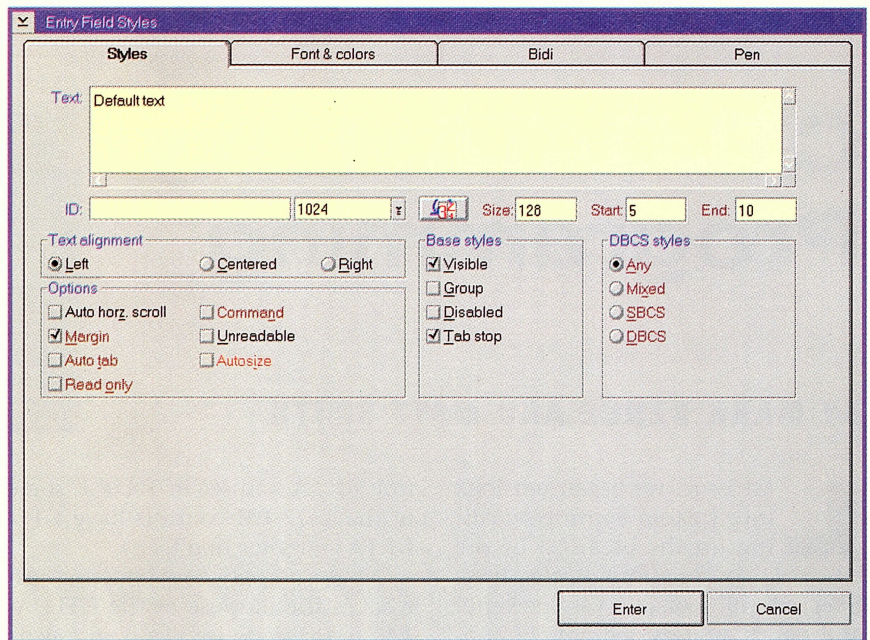


Figure 2: URE Entry Field Styles dialogue.

When the resource is read in from your executable or DLL, the dialogue units are converted to pels using the WinMapDlgPoints API. Nevertheless, the net result is the same and can be seen in Figure 1.

What makes this powerful is that you do not have to write any code within your window or dialogue procedures to change the entry field text size or the text preselection. In the end, it makes your application smaller and faster.

You can create the CTLDATA statement yourself by hand in your resource script files, or you can specify the values right within the styles dialogue with tools like the IBM Universal Resource Editor (Figure 2).

Having this kind of support within the graphical tools makes your life much simpler, because these tools do all the work of updating the resource script file. This is especially true when you deal with complicated CTLDATA structures such as those

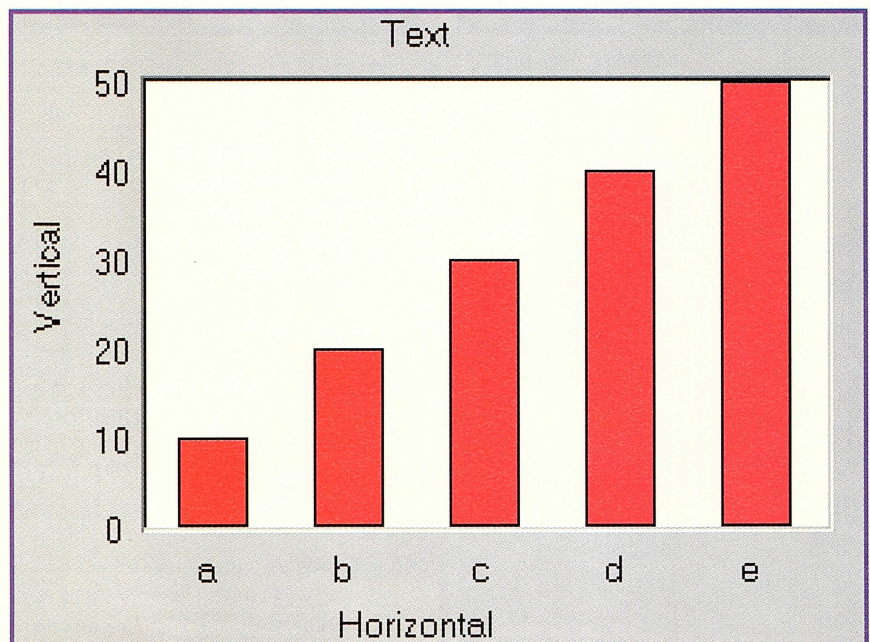


Figure 3: Bar chart control.

Listing 2: BARCHARTCDATA definition.

```
typedef struct _BARCHARTCDATA /* bccd */
{
    ULONG cb; /* Structure Size */
    ULONG ulVersion; /* Structure Version Number */
    ULONG cItems; /* Item Count */
    ULONG cbVertTitle; /* Vertical Title Text Size */
    ULONG cbHorzTitle; /* Horizontal Title Text Size */
    CHAR szVertTitle[1]; /* Vertical Title */
    /* CHAR szHorzTitle[1]; */ /* Horizontal Title */
    /* ULONG aulValues[1]; */ /* Values Array */
    /* BYTE abList[1]; */ /* List Array */
} BARCHARTCDATA, *PBARCHARTCDATA;
```

Listing 3: CTLDATA statement and corresponding binary conversion.

```
CTLDATA 70, 0, 0, 0, 5, 0, 9, 0, 11, 0, 25942, 29810, 25449,
27745, 18432, 29295, 31337, 28271, 24948, 108, 10, 0,
20, 0, 30, 0, 40, 0, 50, 0, 97, 98, 99, 100, 101
```

```
46 00 00 00 00 00 00 00 05 00 00 00 09 00 00 00 F
0b 00 00 00 56 65 72 74 69 63 61 6c 00 48 6f 72 Vertical Hor
69 7a 6f 6e 74 61 6c 00 0a 00 00 00 14 00 00 00 izontal
1e 00 00 00 28 00 00 00 32 00 00 00 61 00 62 00 ( 2 a b
63 00 64 00 65 00 c d e
```

used by the MLE and Handwriting controls.

CTLDATA for the masses

When you are creating your own custom control, you too can utilize the CTLDATA feature. All you really have to do is look at the control-specific messages that the control will handle and determine which of these messages can be part of the CTLDATA.

Let's look at our project for this month—the bar chart control (Figure 3). Four distinct areas need to be defined: the vertical-scale title; the horizontal-scale title; the horizontal scale-item text; and the bar chart item values.

Four messages are defined to set these areas: BCM_SETVERTSCALE-TITLE, BCM_SETHORZSCALE-TITLE, BCM_SETHORZSCALE, and BCM_SETVALUES. If we were to create CTLDATA for the control, it would look like the code shown in Listing 2.

You will notice that the BAR-CHARTCDATA structure has similarities to the ENTRYFCDATA structure but is designed around 32-bit (the use of ULONGs instead of USHORTs)

and contains commented fields at the end. This makes the CTLDATA a variable-length CTLDATA, whereas the entry-field CTLDATA is fixed length.

The cb field is used to record the size of the CTLDATA. Usually, the field can be thought of as a version number holder. For example, the ENTRYFCDATA structure before OS/2 Warp did not have the PVOID pHWXCtlData field. The length of the cb field was eight bytes.

The OS/2 Warp code for the entry field first checks this field to see if it is 8. If it is, it knows that the last field, pHWXCtlData, should not be referenced since it is dealing with a pre-Warp usage of the control. If the field is a value of 12, it knows that it is dealing with a Warp usage of the control and then uses the appropriate routines to decode the CTLDATA information.

When you are dealing with variable-length CTLDATA, the cb field will have a different value depending on the contents of the CTLDATA. Therefore, you should include a second field, ulVersion, to record a version number for the structure.

In this way, you can allow for the

evolution of the control's CTLDATA structure to include new information. The newer version of the control would check the ulVersion field to determine how to decode the CTLDATA.

The next three fields of the BAR-CHARTCTLDATA are used in conjunction with the commented fields. The first of these fields, cItems, defines the number of bar chart items. This value is used in conjunction with the aulValues and the abList. The second and third fields define the vertical and horizontal title text lengths.

These three fields help us decode the data that starts in the szVertTitle field. The easiest way to understand what is going on here is to see the actual data values. Listing 3 shows the CTLDATA statement from the resource script file and the corresponding binary conversion.

If we were to look at the data in a structured form, it would look like:

```
cb = 70
ulVersion = 0
cItems = 5
cbVertTitle = 9
cbHorzTitle = 11
szVertTitle = "Vertical"
szHorzTitle = "Horizontal"
aulValues = 10, 20, 30, 40,
50
abList = "a\0b\0c\0d\0e\0"
```

Will someone get an interpreter please???

Understanding the CTLDATA is a matter of how you define it. In this case, we use certain fields, cItems, cbVertTitle, and cbHorzTitle to define how to decode the data. We also make sure that the data follows a defined layout. This then allows us to interpret the data correctly because we know where each of the various elements lies.

One field we haven't included in our CTLDATA structure, but one you may want to include, is a field for additional style values for the control. It may seem a bit out of line here to discuss styles, but you really only have 16 bits to play with in the control style, because the upper 16 bits are essentially defined for the use of OS/2 PM, and you may run

Listing 4: Horizontal title macro definition.

```
#define PSZH0RZTITLE(pbccd)      (PSZ)((*(PBARCHARTCDATA)(pbccd)).szVertTitle +\
                                   (*(PBARCHARTCDATA)(pbccd)).cbVertTitle)
```

Listing 5: Barchart values macro.

```
#define PULONGVALUES(pbccd)      (PULONG)((*(PBARCHARTCDATA)(pbccd)).szVertTitle +\
                                       (*(PBARCHARTCDATA)(pbccd)).cbVertTitle +\
                                       (*(PBARCHARTCDATA)(pbccd)).cbHorzTitle)
```

out of bitflag style bits. The best way to handle that condition is to place the additional styles within the CTLDATA.

Although it may seem difficult to locate and use the data of the various areas, it really isn't that difficult. We created a set of macros that give us the address of the data element.

Listing 4 shows the macro for the horizontal title. Listing 5 shows the macro for the bar chart values.

Basically, you use the address of the first variable data field as the starting point, and then, using the size of each of the elements, calculate the address within. Alternatively, you could set up additional fields within the structure with these fields that record the offset into the structure of the various variable data fields. This is the method that is used by the binary resources.

Hi ho, hi ho, off to work we go

Now that we understand the CTLDATA data structure, let's look further at how it is used.

When you receive the WM_CREATE message, you would first check to see if message parameter 1 contains a pointer, in which case you would then try to decode the control data.

Now, you may think that this is the last time you would use it, but if you look closely at two OS/2 PM messages, WM_QUERYWINDOWPARAMS and WM_SETWINDOWPARAMS, you will see that the WNDPARAMS structure has two elements that refer to CTLDATA: cbCtlData and pCtlData.

This means that if you want to reset the information for the control

quickly through a minimal number of messages, you can use the WM_SETWINDOWPARAMS message to achieve it. Conversely, if you want to get information quickly, you can use the WM_QUERYWINDOWPARAMS message.

The basic rules

The basic rules for CTLDATA are:

- Use a size field as the first field—this can be used as a version control if the CTLDATA is fixed size. Even if the CTLDATA is variable sized, you should still use the size field since it may be useful to you later if you want to shovel the data around or make a copy of it.
- Use a version field as the second field if the CTLDATA is variable sized.
- Support both WM_QUERYWINDOWPARAMS and WM_SETWINDOWPARAMS messages for CTLDATA.
- Never use pointers within CTLDATA structures. Pointers really only work if you are using the CTLDATA structure at run time. The HWXCTLDATA structure which is referred to in the ENTRYFDATA structure is a pointer. You can't have pointers within resource files since you will never know where in memory the data will be loaded, and no fix-up mechanism is provided. The information contained within a binary resource is just plain binary data that has to be interpreted as is. Because of this fact, you will see references within the handwriting CTLDATA structure to both pointers and other methods to describe the CTLDATA.

Stay tuned, don't change that channel

Next issue we will explain how you can gussy up your custom control with presentation parameters. 

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Matt Smith, Prominare Inc., Toronto, Ont., is lead architect for Prominare Designer and Prominare Validator as well as the new IBM Universal Resource Editor. He's been involved with OS/2 since 1988, has a degree in architecture from the University of Waterloo, and can be reached at msmith@prominare.com.

Resources:

You can download ctrl2.exe from these electronic sources:

CompuServe's OS2AVEN forum (OS/2 Magazine Section).

File area 11 on the IBM PCC BBS, (919) 517-0001, OS/2 Tools section on the OS/2 BBS for IBM TALKLink customers.

FTP to prominare.com and log in as anonymous. The source is located in the /pub/prominare/guicornercodecache subdirectory.

Visit the GUI Corner home page at www.prominare.com/prominare/os2mag.vol3num.html

OK, I Wrote It, Now What?

BY DICK GORAN



The simple tasks that many OS/2 users began doing in REXX have shown them how easy it is to use the language. Now programmers and nonprogrammers alike are relying on REXX as their primary language for OS/2. As programs increase in size and complexity, making them do what you want them to do, rather than what you told them to do, becomes a more difficult task. This process is known as debugging, and I'm going to discuss some techniques that should help you find out what's going wrong when your programs don't work. Also I have some tips on things you can do to make it easier to both prevent careless errors from causing you hours of grief and make it easier to find errors when they occur.

The first kind of error you have probably run into is seeing your program scroll by on the screen producing error messages like:

```
J:\REXXPROG end_1 = TIME('E')
```

```
SYS1041: The name specified
is not recognized as an
internal or external
command, operable program
or batch file.
```

It probably didn't take you too long to realize that the REXX interpreter never saw your program because the first two positions of the first line did not contain the slash asterisk pair (/*) that defines a .cmd file as being a REXX program. The key here is that the error message begins with SYS. All REXX error messages begin with REX followed by a numeric value that specifies the error num-

ber. Often the cryptic message that accompanies the error isn't very much help in telling you what's wrong other than identifying the line number where the error occurred.

The first thing to do when you see a REX error that you don't understand is to invoke **HELP** for that error. The command, issued from any OS/2 session command line, is:

```
help rexn
```

where **n** is the numeric value following the REX error prefix. Leading (or high-order) zeroes are not necessary. Entering **help rex6** is the same as **help rex0006**. Since the numbers assigned to the REXX error messages are reasonably standard across all platforms where REXX is used, some of these messages can be vague when applied to an OS/2 environment.

These error messages are contained in the *.msg files that are generally found in your \os2\system directory. **REXXUTIL**, the application program interface (API) that is a standard part of OS/2, contains the **SysGetMessage()** function, which allows you to extract both the message data and an explanation of the message. At the same time, you can replace variable data in the message with successive strings specified in the call to **SysGetMessage()**. The easiest way to see how this works is using the **REXXTRY** program on your system.

If you are not familiar with **REXXTRY**, it is a REXX program located in your \os2 directory that allows you to enter single or multiple REXX commands on a single line. Multiple commands must be separated by a semicolon. The commands are

carried out immediately. Values resulting from the command can be displayed with the **SAY** instruction. The value returned by a function can be seen by entering:

```
say result
```

Entering

```
say
  SysGetMessage(6,'rex.msg')
```

would display

```
REX0006: %1Unmatched "/" or
quote%2
```

which isn't quite what you see when you have an unpaired quote in your program. The error message you are accustomed to seeing is:

```
REX0006: Error 6 running
J:\REXXPROG\TEMP.CMD,
```

```
line 2: Unmatched "/" or
quote
```

This message results from the substitution capability of the message facility referenced with **SysGetMessage()**. Each of the fields that begins with a % in the message is successively replaced with a string provided with the call to the function. That is how the raw message is transformed into the message you actually see. The \os2\system\rex.msg file that contains the actual error messages has a corresponding *rexh.msg* file that contains the explanations you see when you invoke help for the error message, as I described at the beginning. The *rexh.msg* file can also be accessed with the **SysGetMessage()** function. Listing 1 contains a program that will create an ASCII file with all of the messages

and corresponding explanations from the *rex.msg* and *rexh.msg* files. The substitution fields will not be replaced.

Because of the way the REXX interpreter works, as soon as an error is encountered, you are out of your program and back to the command line (assuming you started your program from the command line) with very little information beyond the error message and sometimes an explanation. What you do at this point is the main purpose of this column. My comments and suggestions are aimed at REXX-related problems rather than at logic errors within your programs.

Since REXX is an unstructured language that does not require you to declare (define) the variables you use before using them, you can be more productive than with a structured language; however, you can also get into some troublesome situations because of this flexibility. The primary method of overcoming this incongruity is the use of the **NOVALUE** condition handler built into REXX.

The condition handlers in REXX are enabled with the **SIGNAL** instruction. Enabling the **NOVALUE** condition handlers results in the transfer of program flow to a routine named **NOVALUE:**—or a routine name of your choice if the **NAME** option of the signal instruction is used—when reference is made to a variable that has not been initialized. What you do in your condition handler routine is up to you. When the condition handler routine gets control, the **SIGL** special variable contains the line number of the instruction that caused the event. In my own programs, when a **NOVALUE** event occurs, I want to know the source line that caused the event along with a list of all of the variables used in the program. This information is similar to the information I want in the event that any of the other capturable conditions—**ERROR**, **FAILURE**, or **SYNTAX**—occur. While the source lines and a variable dump aren't necessarily enough to determine the error, they certainly provide a starting point.

The source line data is retrieved by passing the line number obtained from the **SIGL** special variable to the built-in REXX function **SOURCE-**

Listing 1: 9607ls01.cmd.

```
/* 9607ls01.cmd */
call RxFuncAdd 'SysLoadFuncs', 'REXXUTIL', 'SysLoadFuncs'
call SysLoadFuncs
rex_msg_file = 'rex.msg'
rexh_msg_file = 'rexh.msg'
output_file = '9607ls01.txt'
call SysFileDelete output_file
do i = 1 to 125
  msg_data = SysGetMessage( i, rex_msg_file )
  msgh_data = SysGetMessage( i, rexh_msg_file )
  call LINEOUT output_file, msg_data
  call LINEOUT output_file, msgh_data
end
call STREAM output_file, 'C','CLOSE'
exit
```

LINE(). Capturing the contents of all of the variables in your program requires an additional API. **REXXLIB**, from Quercus Systems, contains the **VARDUMP()** function. **REXX SuperSet/2**, from GammaTech, contains the **GrxDumpVarPool()** function, and Dave Boll's **YDBAUTIL (RXU)** contains the **RxVList()**. All three of these APIs allow you to retrieve the contents of the variable pool, which you can then write to a file.

Because finding a bug in a bug-handling routine is very frustrating, I recommend that you create your own skeleton routine—or adopt someone else's—and use that skeleton as the beginning of every REXX program you write. That way you can be confident of not having a bug within the bug handler and gain some comfort level in using it. Many people have made their own versions of these skeleton programs available on BBSs and other electronic repositories. My own personal routine that I use to start every new REXX program I write is too large to include in this column. However, it is available via anonymous FTP from <ftp.cfsrex.com/pub/skeleton.zip> and with your Web browser from <http://www.cfsrex.com/pub/skeleton.zip>. This file happens to use **REXXLIB** but could easily be changed to use any of the other APIs mentioned here. My own convention for dealing with the output of the variable pool is to write it to a file with the same name as the program and a file extension of *.dmp*.

One drawback to writing the vari-

able pool to a file is that when the **NOVALUE** condition occurs, you will only see those variables that are exposed at that point in the program. If your program contains separate procedures, resulting from using the **PROCEDURE** instruction, the unexposed variables are not available. You can make them available by making all of the common variables part of a compound, or stem, variable and exposing the stem to all of the procedures. In my own skeleton, I use the stem name of *GBL*. and expose *GBL*. in all of my separate procedures.

In many cases, tracing your program is necessary to see what has actually occurred. I'll leave it to you to read about the details of the **TRACE** instruction in whatever REXX reference you use. There is even an environment variable, **RXTRACE**, that when set to **ON** will make your program act as if a **TRACE ?R** instruction was the first instruction of the program. If **STDERR** is redirected for a program started with the **RXTRACE=ON** environment variable (the program is started with *2>file_name*), the effect is as if **TRACE R** was the first instruction in your program. This tracing works well for short programs. However, you certainly don't want to trace through hundreds or thousands of instructions to get to the failure. Though you can insert a **TRACE** instruction at a critical point in your program, you'll then have to edit the program source to remove the trace instruction.

The REXX Column, cont'd on p. 63

Hawk Master

TAKE COMMAND 1.0, ADAPTEC BUS MASTER,
SEAGATE HAWK 2XL 2.0GB DISK

BY BRIAN PROFFIT

Take Command 1.0

It's not that I'm against graphical user interfaces. I really like them. It's just that it's often easier to accomplish what I want from a command line. The windowed command prompt helps, by letting me use a command line from the desktop, but if only there was a way to get the best of both worlds...JP Software, the company that brought us 4OS2, a smart replacement for the OS/2 command shell, has carried

things to the next logical step with Take Command.

Best of both worlds

Take Command brings with it all of the enhancements that 4OS2 users take for granted. Little things like color-coded two-column directory lists and a move command that isn't limited by partition boundaries don't seem so little once you've become accustomed to the extra productivity they bring. Many other

commands that OS/2 users are familiar with have also been enhanced to provide more complete function.

Several new commands are available, too, which aren't available from the OS/2 command prompt. For example, **cdd** allows you to change both the current drive and directory in a single command. You can write more complex batch (.cmd) files also, with new commands like **do**, **drawbox**, and **gosub**. The **ffind** command allows you to search your disk for files quickly, without requiring you to open the OS/2 System folder, then the **Productivity** folder, and then load **Seek** and **Scan** files, just to start the search. It also allows you to conduct searches based on hexadecimal values within files.

There are new functions for use within batch files as well. For example, **@eval[]** will perform an arithmetic calculation of the expression between the brackets. The manual has a great example that combines this function with the alias feature. Assigning the alias **calc** to the expression **echo The answer is: %@eval[%&]** allows you to type things like **calc 3*9** at a command prompt and get a quick answer.

Take Command brings these enhancements into the graphical world. For example, you no longer need the **alias** command to define new names that execute one or more commands and assign different options to those commands. You can now establish aliases in a dialog box. Looking back over your work is easier, too, with the built-in screen scrollbar buffer. Your command window now has a scroll bar, so you

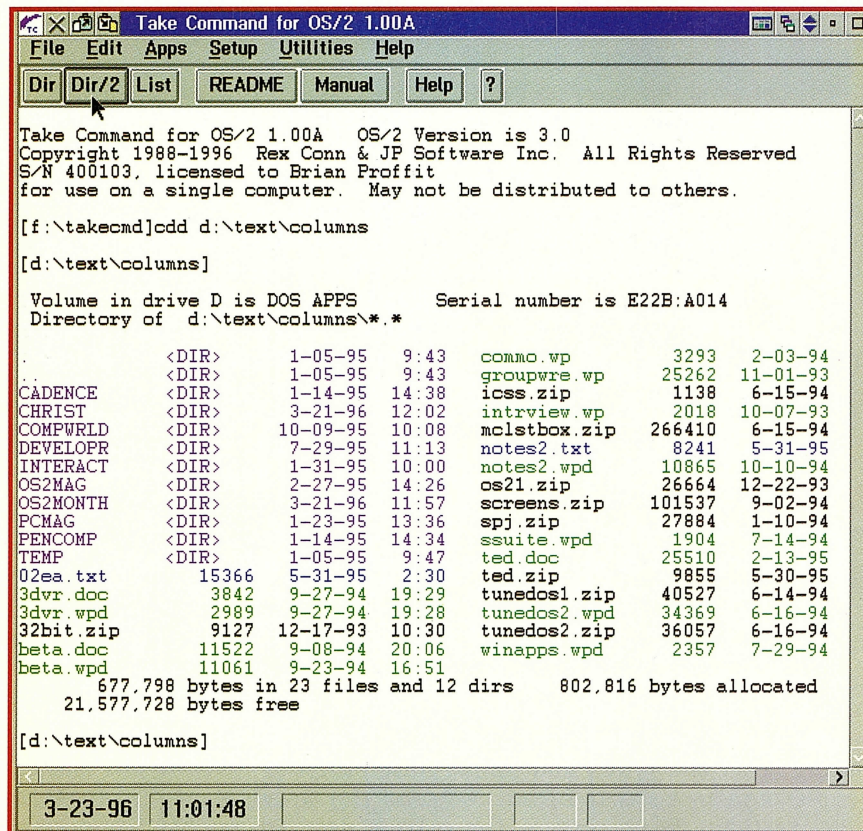


Figure 1: Take Command adds a full-featured graphical command window.

can easily go back and see prior operations.

The new **list** command accesses a graphical file browser that includes a hexadecimal mode. A history of the commands you enter is kept. At any time, you can pop up a list box of these commands and re-execute any of them with a double-click. If you type one or more letters before opening the history window, only the commands that begin with those letters will be displayed.

File name completion has been enhanced, too—especially valuable if you use long file names. Suppose you want to browse a file named *The long file*. At the command prompt, you can type "list T" and press <F9>. The first file name that starts with T is appended to the list command. Since it's a name with embedded blanks, Take Command automatically puts it within quotations, too. If several files are in the directory, you could press <F7> instead of <F9>. Doing that pops up a list box containing all files that start with the letter or letters you typed.

The user interface for Take Command is highly configurable, offering customizable control of nearly all aspects of the interface.

Room for enhancement

JP Software's background is thoroughly command-line-based, and as the company gains experience in the graphical environment, I hope it will take advantage of the GUI even more thoroughly. Take Command does accept drag and drop in one sense: if you drop a file anywhere within Take Command's window, the full path and file name will be inserted at the cursor location in the current command line. But more could be done.

For example, a button on the tool bar is labelled **List**. Clicking on this button pops up a menu asking for the file that you want to see. But if I have just done a directory listing and see a file that I want to browse, I should be able to mark the file name already on the screen and have that name automatically used when I click on **List**. That option should exist for any similar utility I add to the tool bar, such as **edit** or **print**.

You can, however, mark a file name and copy it to the clipboard for pasting into other dialogs.

I'm not sure where JP wants to set the border between itself and graphical wonders like the Drives objects, but I'd also like to see context menus. I'd like to be able to right-click on a file name and see a configurable pop-up menu of functions like **list**, **edit**, and **print**. It's still often easier for me to get to a file through a command line than traversing several levels through the Drive tree, but I want the graphical ease of manipulating the file once I get there. I'd like to be able to mark a file name from a directory listing and drag it onto an application or printer.

Glee or flee

Don't misunderstand the suggestions I've just made. This is version 1.0 of a new product that brings a new level of productivity to the desktop. Sure, there are ways it can be enhanced in the future, but it still offers a lot just as it is.

If you're a command line user, you are almost certain to prefer Take Command over OS/2's windowed command prompt. At \$69, the more casual command line users probably won't bother. However, for those of us who were around during the pre-GUI days, as well as for those who've gotten tired of opening multiple folders just for the joy of doing a drag and drop, it's money well spent.

Adaptec AHA-2940UW Bus Master Seagate Hawk 2XL 2.0GB Disk

For a long time, SCSI was thought of as primarily a server interface, while IDE or Enhanced IDE (a.k.a. ATA-2) was the interface for desktop systems. That may still be true for many people, but OS/2 users in particular tend to be power users. First, hard drives are getting faster and faster, and OS/2 people tend to be at the leading edge. Particularly on servers, the load of multiple 10ms drives can

quickly bog down the I/O bus. The new UltraSCSI interface is a significant jump over 16-bit-wide SCSI-2, doubling potential throughput all the way to 40MB/sec.

As you start to connect more and more peripherals such as CD-ROM drives, tape backup units, and scanners with IDE interfaces, you quickly run into another problem: the interrupt (IRQ) interface wasn't designed with today's power user in mind. It's easy to reach the point where you have to remove one device to add another. SCSI fixes that, too. Adaptec's new AHA-2940UW card can control up to 16 SCSI devices from a single PCI card. The only interrupt needed is for the 2940UW Bus Master card itself. It handles all of the devices for the system—and takes a lot of the load off the system in the process. The 2940UW has three connectors, an external 68-pin connector, an internal 68-pin connector, and an internal 50-pin (8-bit) connector. Only two of these three connectors can be used at a time, however. Termination of the unused connector(s) is automatic.

With the card, Adaptec has bundled EZ-SCSI 4.0, a collection of software for SCSI devices including such goodies as SCSI tape backup, CD player (for SCSI CD-ROM drives), and a Photo CD Viewer. Unfortunately, all these are Windows applications.

Adaptec began shipping the 2940 UltraSCSI last September, but not until now have you been able to exploit this new technology. Not that it has been useless; the AHA-2940UW is compatible with SCSI-1, SCSI-2, Wide and Narrow SCSI devices. I successfully drove an Archive Python SCSI-2 8-bit tape drive with the adapter.

But Seagate was first off the blocks with a hard disk that took advantage of UltraSCSI. Its new Hawk 2XL drive began shipping in April and, at 5400 rpm, it's a speed demon. I tested the 2.0GB model, and it worked flawlessly with OS/2.

I started with a virgin system, installing the 2940UW bus master and the empty Hawk drive. OS/2 Warp detected the 2940UW during installation and copied onto the

Hawk without a problem. Updated OS/2 2.1 and OS/2 Warp device drivers for the SCSI host were included with the card, but if you forget to copy them onto your OS/2 Warp installation disk (like I did), it's no problem. Installation proceeded normally, and I was able to update the driver after installation.

One complaint that has followed SCSI is that, while you don't have to worry about IRQ numbers, you do have to be aware of SCSI IDs—unit numbers that must be unique for each SCSI device attached to a host. The AHA-2940UW supports the new SCSI Configured Automatically (SCAM) protocol, which will automatically assign IDs to SCSI devices that support the protocol. The Hawk 2XL also supports SCAM and was configured automatically for me.

Configuration tuning

I thought I had a problem when I first started testing the new adapter and drive. Disk activity absolutely flew when it was running in the foreground. But when I moved a tight floating-point computation loop into the foreground, disk activity nearly died. A 25MB file copy, which took 21 seconds in the foreground, ballooned up to an ordeal taking more than 15.5 minutes! I expected some degradation—a time around three minutes or so would have been reasonable. But clearly something was seriously wrong.

The answer lies in a fundamental difference between SCSI and IDE, and in something I'd forgotten about OS/2 Warp's installation program. First, recall that OS/2 Warp was designed to require fewer resources, run in less memory, and so on. When you first install Warp, the `config.sys` file has a line in it that says `MAXWAIT=3`. That says that if you're running more than one task at a time, none of those tasks can wait more than 3 seconds before its priority is boosted to make it more likely to get control of the system. If you're running on a slower system, that prevents OS/2 from spending more time switching back and forth than actually running programs. But on higher-end systems, say Pentium-90 and up, the processor can do a

huge amount of work in each second. Your system runs much more smoothly, then, if you change that line to `MAXWAIT=1`, so no task has to wait so long. Simply making that change dropped my copy time from over 15.5 minutes down to a respectable 3 minutes.

This can be improved further if one does some creative tuning. The astute observer may have noticed that OS/2 Warp's default `config.sys` file no longer has a `TIMESLICE` statement. This line allows you to specify the minimum amount of time a thread must have control of the processor before OS/2 takes control and the maximum amount of time a thread can have before the next thread gets a turn. Leaving the line out means that the values can change dynamically, with OS/2 changing them in response to system load. Theoretically this gives the best performance in all situations. Admittedly, a 25MB file copy and a tight floating-point computation loop are not representative samples of a normal job load. Nevertheless, I discovered a long time ago that adding a `TIMESLICE` statement to my `config.sys` seemed to speed up overall performance. I use the line `TIMESLICE=33,59`, which works to prevent any single task from dominating the system. In this case, it lowered the file copy time from 3 minutes to 1.58 minutes. That's a great time with the computer locked in intense math.

These tuning suggestions will probably be of significant help to IDE drives as well, but because of the way the SCSI bus master negotiates with the system bus, it's likely to be of even more help in SCSI systems.

Glee or flee

For users with a single drive and few peripherals, the move from IDE to SCSI may not be worth it. After all, the IDE support is built onto the motherboard and costs no extra. Those needing more power, more flexibility, and more hardware will find the new Adaptec 2940UW UltraSCSI Bus Master and the Seagate Hawk 2XL disk drive to be an excellent combination, and one which speaks OS/2 fluently.

By the time you read this, Seagate may have begun shipping its Baracuda 4LP drives. These are UltraSCSI drives that run at 7200 rpm and should be phenomenally fast. They will certainly be more expensive, but network administrators may want to consider those drives as well. **OS/2**

Brian Proffit was part of IBM's OS/2 team and left IBM to become the director of PC Week's Corporate Labs. He is now the president of Visionary Research, senior contributing editor for OS/2 Magazine, and solutions advisor to PC Magazine. He can be reached at 75300.1466@compuserve.com.

Resources:

Seagate Hawk 2XL 2.0GB Disk (Seagate leaves pricing to dealers.)

Seagate Technology
(408) 438-6550
WWW <http://www.seagate.com>
READER SERVICE NO. 122

Adaptec AHA-2940UW Bus Master (\$349)

Adaptec Inc.
(800) 959-SCSI (7274)
(408) 945-2550 outside U.S.
Fax (408) 262-2533
BBS (408) 945-7727
WWW <http://www.adaptec.com>
FTP <ftp.adaptec.com>
READER SERVICE NO. 123

Take Command 1.0. (\$69, \$29 for registered users of 40S2)

JP Software
(800) 368-8777
(617) 646-3975 outside U.S.
Fax (617) 646-0904
BBS (617) 354-3230
75020.244@compuserve.com
CompuServe: GO JPSoft (PCVENB section 10)
READER SERVICE NO. 124

OS/2, to go? One option: You can buy a laptop and install OS/2 Warp and all your favorite applications. If it doesn't work, most laptop vendors won't want to hear about it. Another option: Buy a laptop from an OS/2-exclusive vendor, like Indelible Blue.

Indelible Blue? Yes, the well-known mail-order software company has started branching out into the private-label hardware business with its Einstein Series desktop and laptop. The laptop is called Maxwell, and it's a high-end system that comes with OS/2 Warp preloaded.

I had the opportunity to work with a Maxwell for about two weeks; I'm pleased to report that it's an excellent performer and a great value.

In the box

Indelible Blue's Maxwell is a computer manufactured by Twinhead, a well-known OEM clone maker (it makes laptops, desktops, and SPARC workstations). The laptop is imported by Diamond Flower Inc. (DFI) and resold by Indelible Blue. The same computer, by the way, is also imported by Hewlett-Packard and is sold under the HP label.

The base-level PC contains a color, dual-scan display, which can display up to 800x600x65K colors. It also has a 75MHz Pentium processor, 810MB hard disk, 16MB RAM, and a slide-out floppy drive (which can also be used externally with a supplied cable). The built-in stereo sound is Pro Audio Spectrum 16-compatible. As of early April, the price for this base unit, with OS/2 Warp Connect installed and one lithium-ion battery, was \$2,868.

I evaluated a higher-end version with a 90MHz Pentium, 1.3GB hard disk, 24MB RAM, both the floppy drive and a slide-out 4x Panasonic

571 CD-ROM drive, 28.8kbps fax/data PCMCIA modem card, and a bright, 10.4-inch, active-matrix display. This system was priced at \$3,999. (Interestingly, our evaluation Maxwell carries a label under the display that named it a "MobilePC 720 from Dura-com Computer Systems.") The weight of the laptop, with hard disk, CD-ROM drive, and one PCMCIA card installed, was 7.22 lbs. according to our high-tech postal scale.

The Maxwell sports a veritable plethora of connectors. On the left side: NTSC output for TV, speaker out, microphone out, headphone out, DC in, and external keyboard. On the right side: two Type II PCMCIA sockets (which can be used as one Type III socket). And on the back: a nine-pin serial, parallel, external SVGA monitor (all under a hinged plastic cover that broke the first time I opened it), game controller, and bus connector for a docking station. There's also one of those new-fangled IrDA infrared ports, which allows for a wireless hookup to a LAN adapter or portable printer.

The typing end of the unit has a

passable 85-key keyboard and one of those tiny digitizers, which Indelible Blue calls the "MousePad," and left and right mouse buttons. At the corners of the keyboard are two stereo speakers, and above it is a little LCD display panel that shows AC/battery status, which disks are in use, and a few other interesting details. The screen has a brightness setting, but no contrast switch.

But wait—there's more! Flip the laptop over, and you'll see that there aren't the usual fold-down legs; this makes typing a little difficult. There are three trays: one for the slide-out floppy/CD-ROM drive, one for the battery, and another (secured with a tiny Phillips-head screw) for the hard disk. And finally, two small doors, each hiding one memory socket.

Up and running

Indelible Blue preloaded the evaluation Maxwell with a lot of applications software and preconfigured it for a dial-up TCP/IP connection using the 28.8kbps PCMCIA modem and LAN Distance. I found it ready to use: Just turn it on, and up comes OS/2 Warp.

The big question is, as always, performance. My phrase: "Butt-kicking." The 90MHz Pentium felt as snappy as my home 120MHz Pentium desktop system and put my office 66MHz 486 to shame. That's largely a function of the highly responsive active-matrix display and its Cirrus Logic chipset, and also of the 24MB RAM—more memory does make an incredible difference.

I haven't seen the dual-scan display that Indelible Blue sells with its lower-end Maxwell systems. However, it's been my experience that dual-scan is only barely adequate for a



Figure 1: Indelible Blue's Maxwell laptop computer.

machine destined for irregular use (say, only in hotel rooms during business trips) and is unacceptable for daily use in the office, at home, or for making presentations. Not only does active-matrix have brighter colors and higher contrast, but it's also viewable at a wider range of angles. So, if you're buying any modern laptop, I strongly recommend the active-matrix display; from Indelible Blue, it adds about \$300 to the price.

One nice feature is the ability to put either the floppy disk or fragile-looking 4x CD-ROM into the drive tray. You can't hot-swap the drives, however. Once you've booted, the drive that's installed needs to stay there. I found the best configuration was to leave the CD-ROM drive installed internally. In the office, I'd hook up the floppy drive externally, using the supplied cable. When traveling, I'd leave the 13-oz. floppy behind and transfer files back to the office using CompuServe or ftp.

One part of the hardware that I can't leave at home is the AC power supply. Some new laptops have the power supply built into the system unit, so you'd only need a cord. Maxwell's not at that point. Although the power-supply brick is smaller than those of yesterday, it's still a brick that weighs about 15 oz. with the cord. I'd also carry a spare battery, which weighs in at a tidy 12 oz.

I don't know about you, but I'm not productive when using a GUI—especially OS/2's Workplace Shell—in 640x480 resolution. The Maxwell is the first OS/2-equipped laptop I've used that offers 800x600, and there's no going back (but you can switch down to 640x480, if you really want to.) As far as color depth: The ability to show 65K colors is great, but working in 256 colors is more than adequate in a laptop. When in the of-

fice, you can use an attached external monitor at 1024x768.

My biggest disappointment is with the keyboard and the MousePad pointing device. The keys have a slightly mushy feel, with a silent but noticeable tactile feeling when pressed. I found it difficult to achieve any real typing speed, even when the entire laptop was propped up to pitch the keyboard at a decent angle. Even after more than a week of continuous use, I'm still not comfortable with it.

The 2.5-by-1.8-inch MousePad is even worse—but let me quickly state that this is an even more subjective opinion. I've used similar digitizers in other laptops, most notably the slightly smaller Alps GlidePoint that's built into the Texas Instruments Extensa 560CDTs. They're all equally terrible. The problem, of course, is that those little trackballs built into earlier laptops kept breaking; now, most vendors are adopting these digitizers because they should prove more reliable. But they're not easy to use, have no tactile feedback, and I just don't like them. (And neither do many other people I've informally queried, by the way.)

I have had some specific problems with the Maxwell's MousePad. When

typing rapidly using DeScribe or IBM Works, the "insertion point" would unexpectedly jump to the current cursor position—without my having touched the left mouse button or even touching the MousePad. This is very disconcerting and has led to many unexpected changes in word-processing documents; the only remedy has been to keep a constant eye on the screen (which I usually don't do when typing) so as to detect these movements before any damage can occur. Indelible Blue seems at a loss to explain the problem.

Bottom line on the keyboard/pointer situation: Had this not been a product evaluation, I would have hooked up an external keyboard and mouse after the first day. If you are a touch-typist, I recommend that you test out the Maxwell—or any other laptop—during an evaluation period. If you can't become comfortable with the keyboard and pointing device, send it back with no apologies.

Running under OS/2

It's great that the Maxwell comes preloaded; it's even better that everything seems to work properly. In the evaluation unit, the screen, CD-ROM drive, plug-and-play PCMCIA slots, and fax/data modem are all properly configured. But then again, would you expect Indelible Blue to have sent out a machine for our evaluation that's not been thoroughly tested?

If you are looking for even more preconfiguration options, Indelible Blue offers the ability to install your preferred version of OS/2 Warp and your choice of BonusPak goodies. The company lets you choose the number and size of partitions and pick which will be HPFS. It'll even install other products from its hardware/software catalog; depending on the

True Blue

For comparison's sake, I called IBM PC Direct to spec out an IBM ThinkPad similar to Indelible Blue's Maxwell. The helpful salesperson initially recommended their new 6.1-pound ThinkPad 760CD, with the 800x600 12.1-inch display, but later amended her suggestion, because the 760CD is in such short supply.

We finally settled on a lesser machine: an IBM ThinkPad 760LD, with 90MHz Pentium processor, nickel-metal-hydride (NiMH) battery, 10.4-inch 640x480 active-matrix display, swappable floppy/CD-ROM drives in a bay, and 810MB hard disk (larger sizes are not available from the factory with this model).

The price: the baseline 760LD with Windows 3.1 and OS/2 Warp, but with only 8MB RAM, \$4,549. Add 16MB RAM for \$709, and a 28.8kbps PCMCIA fax/data modem for \$314, and you've got a total of \$5,572—a nearly 40% higher price, and with a smaller hard disk, shorter-duration battery, and lower-resolution display.

If you're wedded to the IBM brand name, get great IBM discounts, or really prefer its (in my very subjective opinion) superior keyboard and TrackPoint III pointing device, those extra dollars might make sense. But for most budgets, the True Blue system just isn't cost-effective.

Review

product's complexity, there might be an extra installation charge.

Your Opinion Matters

As you may have noticed, *OS/2 Magazine* has started paying more attention to PC systems and peripheral hardware. We don't have the resources to conduct rigorous benchmarks and compatibility testing, but it's our intention to continue publishing hands-on reviews of OS/2-related hardware. Please tell us which hardware products you'd like to see reviewed, and what criteria are most important to help you make an informed purchasing decision. You can reach us at os2mag@mfi.com, and thanks for your help. -Alan Zeichick

Wrap it up

I like the computer's size and weight. Love the screen, slide-in CD-ROM drive, plethora of ports. Dislike the keyboard. Hate the MousePad. For the price, the evaluation system that we looked at is a great deal for about four kilobucks, which is much less than you'd pay for a lower-powered IBM ThinkPad 760LD configuration.

Only one factor, however, gives me pause. We're dealing with a private-label brand from a catalog merchant, imported by another company, and manufactured by a third. Although I have faith in Indelible Blue, and Twinhead is a long-established clone maker, you're dealing with quite a supply chain if you crack your LCD panel or smash your CD-ROM drive. Although Indelible Blue says that it has a long-term agreement with DFI and Twinhead, I'm left somewhat uneasy; only the fact that HP sells the same basic hardware (at a

higher price), so you can order replacement parts, makes me feel a little better. But that's an issue for you to decide; it's not a technology question.

Based on a two-week evaluation, I'd give Indelible Blue's Einstein Series Maxwell laptop two thumbs up. If you can stand the MousePad, it's a great performer and a great value. **OS/2**

Alan Zeichick is the editor-in-chief of *OS/2 Magazine*. You can reach him at zeichick@acm.org or at 76703.756@compuserve.com.

Resources:

Maxwell (Base, \$2,898)

Indelible Blue Inc.

(919) 878-9700

Fax (919) 878-7479

WWW <http://www.indelibleblue.com/ib>

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The World of Objects, cont'd from p. 47

code in Listing 4, and `meetOtherDog`, using the algorithm of your choice.

6. Youth groups are allowed to have help with the coding, but you must promise that they developed the algorithms on their own.

7. One entry per e-mail address. If a youth group is involved, it must be identified.

8. No cheating by overriding methods you shouldn't override or updating private data you shouldn't be accessing.

So? Are you in?

Your first stop is the SOMobjects Home Page where I will maintain a full set of the official rules and a .zip file containing all the files you need to compile and test this framework using VisualAge C++. I will include several sample dog types. On the SOMobjects Home Page, look for a link to the OS/2 Magazine Dog Meets Dog Contest. The URL for the SOMobjects Home Page is <http://www.fc.net/~roger/owatch.htm>.

Good luck. You'll need it. My Girl Scouts are bad. **OS/2**

Acknowledgements

I am grateful to Girl Scout Troop 161 (Amy, Emily, Meg, Catie, Erin, Zer, and Chandra) and its intrepid leader (and my wife) Alice Sessions for their inspiration for this article.

Roger Sessions is president of Object-Watch Inc., a company specializing in training and consulting in the use of SOM and DSOM. He has spoken at over 30 conferences and has written extensively. His books include Object Persistence: Beyond Object-Oriented Databases; Class Construction in C and C++; Object-Oriented Fundamentals; and Reusable Data Structures for C. Roger also publishes an Internet newsletter called ObjectWatch on SOM and can be contacted on the Internet at roger@fc.net.

The REXX Column, cont'd from p. 56

By using a trace instruction that gets its settings from your own environment variable, you can eliminate this hassle. I use an environment variable of `TRACE` in my own programs and have a group of instructions, all written as a single line with the instructions separated with semicolons, which I move around in the program as I need it. When I want it out of the way, I move the entire line to a position in the program where program flow will never reach it. I call this instruction my "magic" trace instruction, and it lies dormant in `skeleton.cmd` until I need it. I can then move it to the point where I want it and run the program with an environment variable of `SET TRACE=?R` to cause interactive tracing. I then reset the environment variable with `SET TRACE=` to negate the trace. **OS/2**

Dick Goran is the author of The REXX Reference Summary Handbook, an OS/2 reference. He has been in the computer industry since 1961 and was in the IBM mainframe systems software development business until 1987. He teaches OS/2 REXX to corporate clients and lectures on OS/2. His free REXX utility programs can be downloaded from OS2DF1, Lib 6 on CompuServe or FTPed from <ftp://ftp.cfsrex.com/pub>. He can be reached via e-mail at 71154.2002@compuserve.com.

Resources:

REXXLIB (\$50)

Quercus Systems
(408) 867-7399
WWW <http://www.quercus-sys.com>
READER SERVICE NO. 120

Rexx SuperSet/2 (\$79.00)

GammaTech
(405) 947-8080
E-mail 72274.102@compuserve.com
READER SERVICE NO. 121

Dave Boll's RXU (free for download)

FTP <ftp.cfsrex.com/pub/rxu19.zip>

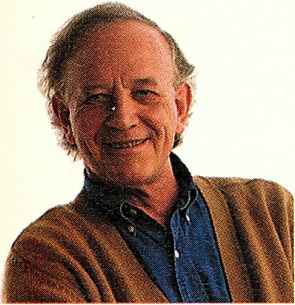
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Choose Your Linguistic Weapons!

BY STAN KELLY-BOOTLE



I am writing this column under unbelievably adverse conditions and earnestly crave your sympathy. Here I am in sun-drenched, skin-cancering Callian, one of the oldest villages in the Haut-Var, Provence, humbled by its postcard 11th-century chateau and distracted by the heavy-metal clunk of *jo à pèd-tanca* balls and the cries of the Pernod-crazed locals. Further (can this litany of doom continue?), I have only the Francés-Prouvençau half of Jules Coupier's *Diciounàri*, so I'm unable to follow all the nuances of the players' altercations. Still, it's good to hear that the old (pre-Latin, they reckon) Provençal, enshrined in the songs of the Troubadors, survives in these parts.

Which of our current unnatural computer languages can match this longevity? Which of them will still be around 3,000 years hence? Or even 300 years hence? Oft-mocked COBOL, of course, is an obvious candidate, having achieved a certain critical-mass immortality: megatons of working legacy code that seem beyond economical conversion or write-anew and are forever fated to be maintained, yea, even beyond maintainability. FORTRAN, too, may never die in spite of the sniggers. There are simply too many reliable FORTRAN mathematical libraries available, crafted in the days of yore when numerical analysis was taken seriously.

What of the more modern, post-tab-card languages? In the 40 years since COBOL and FORTRAN appeared, we have endured two dizzying paradigm shifts in software development: structured programming and object orienting. The two leading

languages that exemplified and encouraged structured programming were Pascal and C, each of which subsequently spawned OOP (object-oriented programming language) extensions (Object Pascal and C++). These extensions are dubbed "hybrid," because they retain their nasty procedural origins, in contrast with the so-called "pure" object-oriented languages such as Smalltalk and Eiffel. C/C++ have undoubtedly gained the day over the Pascalites, chiefly through the UNIX connection, portability, and a serious pursuit of ANSI/ISO standards. Standardization, alas, is a two-edged sword: you may have to freeze in anachronisms (don't break existing code) and, at the same time, suffer endless rounds of democratic tinkering (just one more feature or else). It may be premature, but fashion insists that I mention Java, a sort of purified, safe version of C++, as an OOP contender. Indications are that Java might lose its virginity as the nit-picking theologians descend.

Before you place your bets on which of these object-oriented languages will win the survival stakes, you should read Bertrand Meyer's refreshingly elitist *Object Success—A Manager's Guide to Object Orientation, Its Impact on the Corporation and Its Use for Reengineering the Software Process* (192 pages, Prentice Hall, London, UK, 1995, ISBN 0-13-192833-3). Meyer, a leading object technology pioneer, makes a powerful, up-front case for Eiffel, the language he invented, and which embodies his software-engineering philosophy. Eiffel combines the

strengths of Smalltalk (pure object-oriented) and C++ (efficient, compiled code) while avoiding their limitations. Eiffel was the first language to implement assertions as the basis of design by contract. Suppliers (a.k.a. servers) and clients establish a contract via pre- and postconditions, which define their obligations and benefits rather like a legal contract. The gap between program specification and source code text is thereby narrowed. Eiffel's multiple-inheritance mechanism is more powerful than Smalltalk's (single-inheritance only) and more flexible than that of C++. Unlike C++ and Smalltalk, Eiffel provides both static typing and built-in garbage collection. Eiffel is now available on all the major platforms: DOS, Windows, UNIX, and, of course, OS/2.

As indicated by its extended title, *Object Success* is aimed at IS managers. The more technical programming details are covered in an appendix. Meyer presents the clearest account yet of object-oriented terminology and concepts, and I strongly recommend this book to all managers, programmers, and users who want to filter out the practical realities of object-oriented technology from the confusing hype. **OS/2**

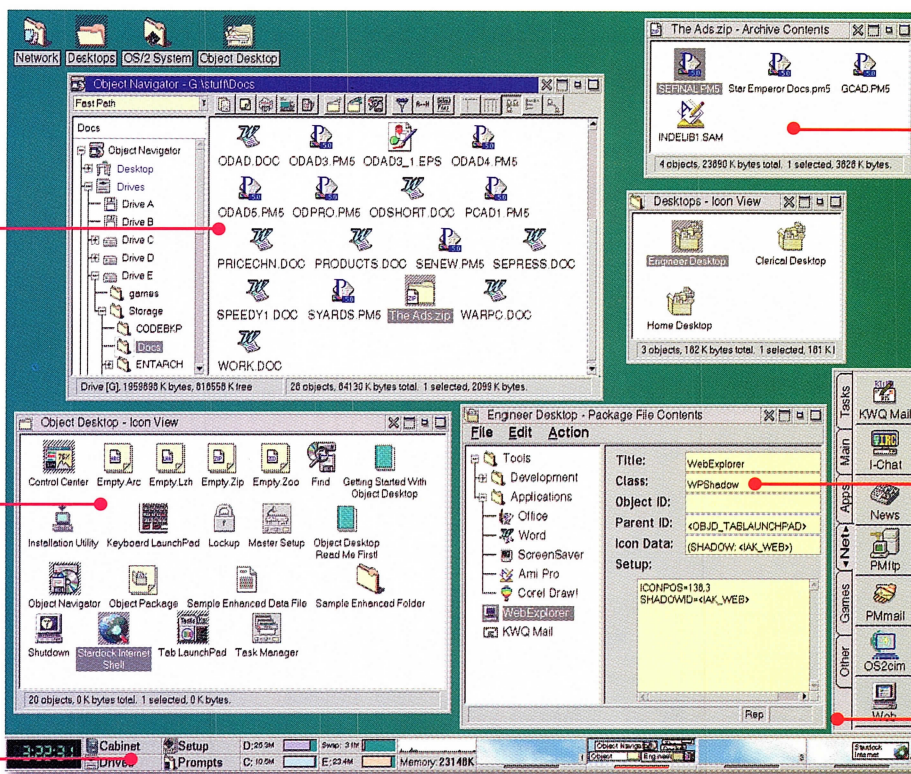
Stan Kelly-Bootle started computing on EDSAC I at Cambridge over 40 years ago. His latest book is *The Computer Contradictionary* (1995, MIT Press). He welcomes e-mail via CompuServe 70323,1560 or Internet skb@crl.com. Try his Web home page: <http://www.crl.com/~skb>.

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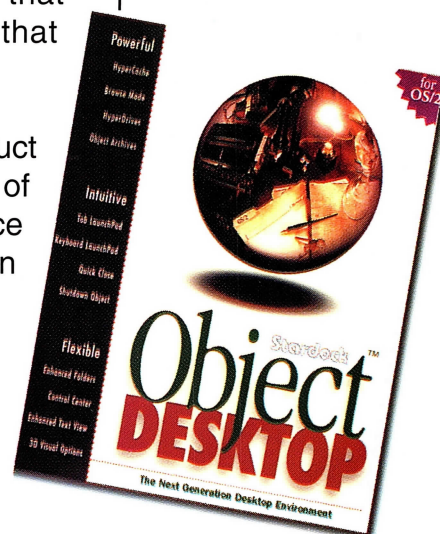
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